

# HP Professional

JULY 1998

HP-UX

♦  
Windows NT

♦  
MPE/iX

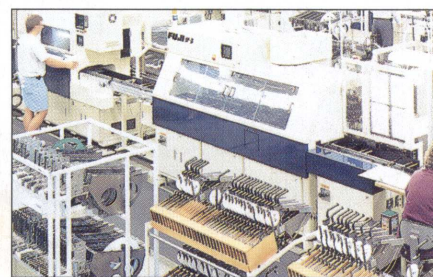
A BCI PUBLICATION

## DATA WAREHOUSING

Looking For Data In All The Wrong Places?

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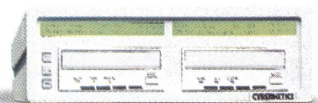
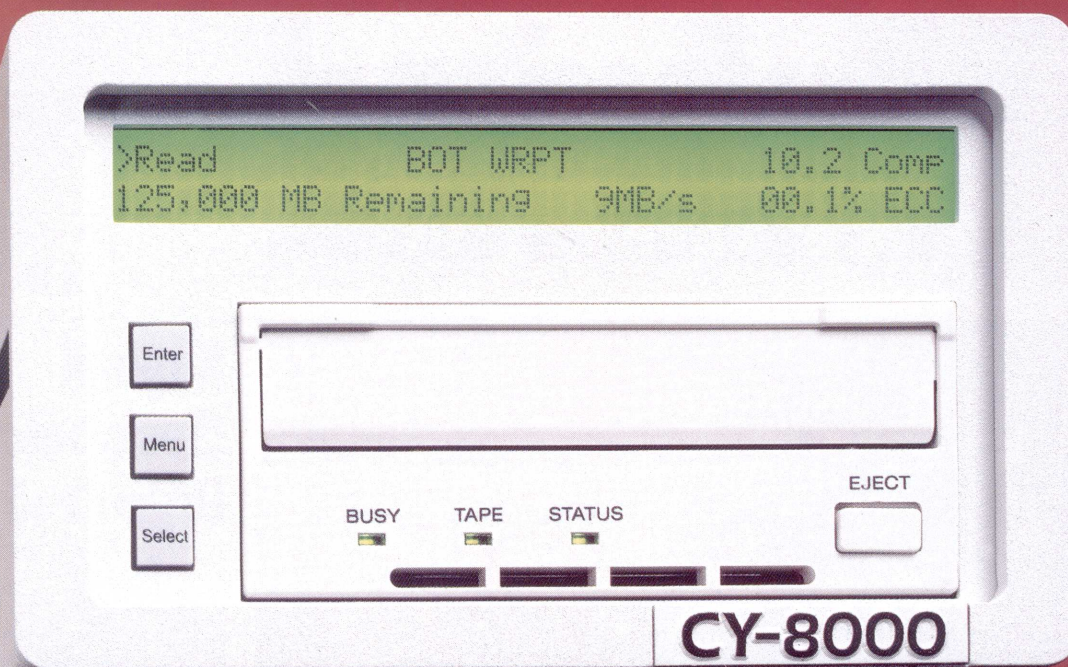
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- ♦ Cognos' PowerPlay Server Web Edition 5.5
- ♦ Acta's ActaLink for SAP R/3



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# Laying IT To Bare

## Celebrating the past while informing the future

AS WE ALL KNOW by now, change in the computer industry is the norm, not the exception. So, as *HP Professional* celebrates its eleventh year of serving the information needs of the Hewlett-Packard computing community, I wanted to reflect upon and reaffirm our commitment to that community.

There certainly have been plenty of changes in the market since our first issue appeared in May 1987. Perhaps the most significant change is the shift of IT from the domain of the back room to the prominence of the front office where business decisions are made. Now, more than ever, it's critically important for you — whether you are an IT manager or IT vendor — to know not only what's in front of, but what's behind HP's overall computing strategy. How better to assess your company's computing needs for the 21st century?

### GET ENTERPRISE-WISE


In a effort to better serve our IT audience, the editorial staff began a process of expanding the focus of the publication to reflect current and imminent changes in the HP enterprise computing market. We now provide coverage on the integration of HP-UX and Windows NT. We are addressing the issues surrounding E-commerce, data warehousing, network management and enterprise resource planning. This year an HP 3000 demographic supplement was added to address the IT needs of HP 3000 users. And we've been working hard to provide you with new and exciting additions to our Web site ([www.hppro.com](http://www.hppro.com)).

"We will continue to provide editorial coverage that enables IS departments to better leverage their company's investments in information technology by reviewing products and technology from an installed base perspective," says Tom Wilson, executive vice president of *HP Professional's* publishing company, Boucher Communications, Inc. "And, as 'The Magazine for Hewlett-Packard Enterprise Computing,' our advertisers can feel confident that their sales messages are getting into the right hands."

### OUR COMMITMENT

You've told us that you think of *HP Professional* as a reliable and trusted IT information resource. So as we begin our twelfth year in the market, our commitment remains the same — to bring an intelligent and independent analysis of HP's strategies, products and promises to our subscribers and to put HP computing technologies in context with the rest of the industry. That's why *HP Professional* is in touch with the IT events that affect you and is focused to meet the needs of IT managers today and in the future.

Best regards,



**Leslie Ringe**  
[ringele@boucher1.com](mailto:ringele@boucher1.com)



## HP NEWS &amp; VIEWS

## A T P R E S S

## Live (Almost), From New York - It's PC Expo

Some of HP's announcements from last month's annual PC extravaganza:

**Support For Microsoft's New NT Server Family** - HP will be working with the Redmondians to help customers move business-critical applications to a thin-client/server environment on HP NetServer systems. After working with the new Microsoft product through its pre-release program, HP engineers were convinced that it scales exceptionally well across the NetServer L Series. The two firms will be working together to provide Terminal Server sizing information and guidelines. For more information, go to [www.hp.com/netserver/techlib](http://www.hp.com/netserver/techlib).

**New Kayak XU and XW PC Workstations** - The new workstations feature either a 350MHz or 400MHz Pentium II processor, Intel's new 440BX AGPset and a 100 MHz front-side bus which, HP claims, will provide the "industry's fastest PC-workstation performance." Expected street prices will range from \$4,030 for the XU model with 64MB Ram and a 4.5GB hard disk, to \$9,600 for the XW model with 128MB SDRAM, a 4.5 GB hard disk and HP VISUALIZE fx4 graphics.

**New Category of PC Workstations** - The new minitower or desktop Kayak XA-s PC workstations, expected to start as low as \$2,200, include either single or dual Pentium II processors (operating at up to 400MHz), the 440BX AGPset, the Matrox Productiva G100 graphics subsystem, up to 768MB of SDRAM, Ultra ATA-33 or Fast/Wide Ultra Wide SCSI hard disk, a 32X CD-ROM drive and HP MaxiLife and TopTools management software.

## HP, LAWSON, ORACLE BUNDLE SUITE

Lawson Software has teamed with HP and Oracle to offer their SuiteExpress for Human Resources. The bundle combines Lawson's own INSIGHT Human Resources Process Suite with a HP NetServer system for Windows NT and Oracle8 database server plus implementation services for companies with under 2,000 employees.

SuiteExpress' key modules include payroll, employee and manager service centers, benefits administration, time and attendance, training administration, personnel administration, time accrual and tips/allocation. There is also a Web-based employee and manager self-service capability that

eliminates repetitive entry tasks usually performed by small HR staffs at mid-sized companies.

For their part of the deal, HP provides a NetServer LH Pro 6/200 with 576 MB DIMM memory, 16.8 GB Hot-Swap Ultra SCSI disk, Windows NT 4.0, a 24 GB SureStore DAT24I tape drive and OmniBack II software. In keeping with HP's recent emphasis on helping the channel support small-to-medium customers, the server also comes installed with HP's Remote Assistant card and PCAnywhere32 software that allows for remote diagnostics and support.

Handling the implementation services that include configuration, assembly,

burn-in and testing is Integration Alliance, a company that specializes in developing channel programs and strategic partnering opportunities for resellers. The firm already builds, integrates and distributes HP's complete line of business servers including HP-UX, Windows NT, MPE/iX, workstations and Netstation systems.

SuiteExpress is available from Lawson's STAR partner network, their North American web of sales/service partners for the mid-market. To get more information on the SuiteExpress package, call (888) 336-6061 or check [www.lawson.com](http://www.lawson.com).

## HP TO EXPAND ENTERPRISE INTERNET APPLICATION ARCHITECTURE

HP recently announced Domain Foundation Tools and Foundation Ware (see last month's News & Views). Now they've announced that they will be marketing third-party development tools and middleware technologies to expand the functionality of those products' Internet development and deployment architecture.

Through the company's Developer's Edge program, partners will provide products to complement Foundation Tools and FoundationWare. The list of vendors reads like a who's-who of Internet developers. They include BEA, NetDynamics, Netscape Communications, Novera, Oracle, Progress Software, Rational Software, Roque Wave Software, Inc., TakeFive Software, Sterling Software, Sybase, TIBCO, Vitria and WebLogic.

Each of these vendors has endorsed HP's technology roadmap which also includes enterprise Java technology, HP-UX 11 and 64-bit computing for PA-RISC and IA-64. HP's hope is that the offsprings of these pairings will deliver end-to-end solutions for unified and simplified development and deployment of Internet applications in mixed UNIX/NT environments.





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## YEAR 2000 COUNTDOWN



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(\*According to CFO Magazine Dec 1996)

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## HP Powers PeopleSoft

HP simulated 10,000 concurrent users on a HP 9000 V2250 Enterprise Server, threw in PeopleSoft 7 Human Resources and achieved the industry's highest performance. With all users experiencing sub-2.1 second response times and a weighted average of less than 1.5 seconds, that outperformed the prior best by 66 percent.

The test, performed in Cupertino, Calif. by HP engineers, was done with a 9000 V2250 Enterprise Server running HP-UX and an Oracle 7.3.3.4 database, three HP 9000 K570 application servers and Mercury Interactive which simulated the benchmark load. The database server utilized 36 percent CPU and the application servers utilized 52 percent CPU.

**“It was a big yawn. I would want to know, what Compaq isn't going to do.”**

—Jim Carlson, HP's director of worldwide marketing for IA-64 systems, commenting on the official Compaq/Digital June 12 merger announcement.

## HP, Oracle Foresee HA Protection

Directed at enhancing HP's Electronic World strategy for harnessing the utility of the Internet, the two companies intend to offer a highly available and predictable application solution, using the Web Quality of Service (QoS; see last month's News & Views), technology-enabled HP 9000 Enterprise Server and the Oracle Application Server for developing and deploying applications.

HP and Oracle also intend to deliver a multi-vendor support model for mission-critical environments which will offer mutual customers a single point of contact and integrated services to reduce the risk of downtime.

# HP UNVEILS UNIVERSAL CONSULTING ORGANIZATION

HP has reorganized their consulting and systems-integration team, the Professional Services Organization, shaping it around global service areas and renaming it HP Consulting. HP's strategy is to develop their consultants' expertise in particular areas, which they hope will forge a significant competitive advantage for their clients worldwide.

“HP Consulting intends to be an industry leader in every service...it offers,” says Jim Sherriff, general manager for HP Consulting. “Our consultants have thorough knowledge of their clients' IT environments, and they can...deliver services that help [them] achieve a competitive advantage.”

The Professional Services Organization employed 5,500 professionals worldwide and was responsible for \$1.8 billion in annual revenue. Its focus

was IT consulting from a country-based perspective with each country acting as an autonomous P & L center. The new organization will adhere to a global structure that, Sherriff says, will allocate consistent, quality resources globally. He adds that consultants will all receive the same formal certifications through an international program that will guarantee consistency from one country to the next.

“Multi-national corporations can expect the same level of expertise at each of their locations.”

HP Consulting will also be a “flatter organization,” says Sherriff, with more senior management being closer to their clients and the elimination of several levels of management. The new organization will remain partner-oriented, with strategic relationships strengthened with “best-in-class” providers like SAP

and PeopleSoft.

HP Consulting will focus on these global services:

**IT Infrastructure Services** — for the design, integration and management of client/server infrastructures.

**IT Service Management** — to advance the perception of IT organizations as customer-focused and strengthen the relationship between IT managers and business leaders.

**Enterprise Desktop Management Services** — to help clients design and deploy reliable and flexible enterprise desktop environments and help manage TCO.

**Enterprise Messaging** — HP will design, implement, migrate and operate enterprise messaging using Microsoft Exchange and/or HP OpenMail as part of its overall strategy to build its vision of the Electronic World.

**Extended Enterprise Resource Planning** — to work with selected ERP, e-business, supply-chain and product-data management partners and offer consulting and integration services for both UNIX and NT environments.

**Customer Service Delivery** — to enable e-business transaction services, call center CTI and to provide customer-service delivery solutions,

**Telecom/ISP Network Services Delivery** — to work with telecom and Internet service providers to design and implement specific IT solutions for clients.

Sherriff says that the new organization is live now and expects to be fully operational by the end of the year.

## NEW MDL DRIVES AND DIFFERENTIAL CONVERTER

MDL Corporation (Redmond, Wash.) has announced a new line of external disk subsystems that uses the new Ultra SCSI2 LVD low voltage differential disk drives available on HP workstations. The drives implement a new low voltage differential Ultra2SCSI to FAST Wide Differential SCSI2 converter which allows them to work on HP's older FAST Wide Differential SCSI2 bus.

MDL spokesperson, Steve Newman, explains that disk subsystem technology has evolved from the FAST Wide SCSI2

Differential of the early 90's to Ultra SCSI to the current Ultra2 SCSI. He adds that the new bus is not backwards compatible, eliminating the possibility of using the new drives on older HP systems. Newman added that with the FAST Wide SCSI2 technology becoming obsolete, users of older servers will find it difficult to add storage capacity. The converter solves that incompatibility problem.

The drives are available in 4, 9 and 18 gigabyte sizes. For more information check MDL's Web page at [www.mdlcorp.com](http://www.mdlcorp.com).



## HP AND GANYMEDE TEAM NETWORK TESTING TOOLS

HP is already a leading supplier of network test and management tools and Ganymede Software develops performance-management software for multi-protocol networks. To them, it makes sense to combine their efforts and jointly develop and sell products for network equipment manufacturers, service providers and the enterprise-network market.

Ganymede's *Chariot* software uses remote soft-

ware agents to generate sample "real-world" application-layer traffic to evaluate the impact on network performance of new applications or network changes. *Pegasus* monitors ongoing network performance and generates threshold alerts.

HP's network analysis products like Internet Advisor, permit network managers to analyze a variety of traffic and protocol information and anticipate

and resolve LAN, WAN and ATM problems.

The two are painting a picture of a customer who combines the suite of products to identify application-layer performance problems and determine whether the cause is an application or network device and, if necessary, identify and resolve the underlying network issues.

Under the terms of the agreement, *Chariot* and *Pegasus* will be resold through HP's worldwide sales force and the two companies will work together to develop integrated products.

## PLATINUM'S PLANS FOR INTELLIGENT WAREHOUSE

When PLATINUM technology bought HP's Intelligent Warehouse and DataMart Manager products in February, (see News & Views, March 1998) their senior vice president for data-ware-

housing solutions Tom DePasquale said "We will integrate them with PLATINUM's Microsoft Repository and add support for more platforms."

By unveiling Microsoft Repository 2.0 running on

a Sun Solaris system supporting a Sybase database recently, a milestone that marks the first time a Microsoft Repository has operated on a non-Microsoft platform, PLATINUM has taken the first step in that direction.

Ultimately, according to Bob Robinson, vice president of PLATINUM repositories, Intelligent Warehouse will begin the conversion process to a PLATINUM Microsoft Repository during the second half of 1998.

"HP is the biggest market we have in UNIX," he says, adding that the port to HP-UX and Oracle will take place coincidentally and will lead "hopefully, in the next two months" to a working beta. By the end of the third quarter the goal is to have a platform on which ISVs can start developing products. Robinson added that 150 developers have already expressed interest in getting started and PLATINUM is still receiving several inquiries a week.

## HP AND XEROX IN PATENT BATTLES

Xerox Corporation recently filed a patent infringement suit against HP seeking a permanent injunction prohibiting HP from manufacturing and selling certain thermal ink-jet printers and related supplies, claiming they contain Xerox-patented technology.

Two weeks later HP returned fire by filing a patent infringement suit against Xerox seeking a permanent injunction prohibiting them from selling certain copier products that contain HP-patented technology.

"There's no question that their suit caused us to take a fresh look at our patent portfolio," says Jeremy James, a spokesperson for HP. "But, the two suits are not related since they are about different technologies."

James explained that Xerox uses touch-screen technology in certain of their Document Centre and color copier products that HP claims to have patented on March 10, 1987 for use in touch screen PCs they marketed at the time. James added that, after review of the Xerox suit, HP does not believe it has infringed on the Xerox patent, making the suit invalid.

A Xerox spokesperson did not return our request for comment. Both parties are now reviewing the details of the suits and no further court dates have been set.

## Full Of Client-Server

We would like to clear up the mistaken notion that Mitchell Humphrey's FMSII is "not a fully client-server product" as you wrote in your May case study of Forsythe Technologies.

FMS II is built on a three-tier, client-server architecture. The client, is a so-called "thin client." It implements only the user interface tier. In the HP 3000 and HP 9000 implementations, the other two tiers — database and application logic — both run on the server. In the Windows NT implementation, the application logic may reside on the same server as the database tier, or on one or more additional application servers.

If all client and server systems are on a network, FMS II can use TCP/IP network connections for all client-server communication. This mechanism also supports transport via the Internet and dial-in access in some environments. *This solution requires no third-party software.*

If client systems require direct serial connection or direct dial-up connection to a 3000 or 9000 server, FMS II can use WRQ's Reflections terminal emulator and Process to Process Link (PPL) software for client-server communication. In this environment, the user logs onto the server using the Reflections terminal emulator.

After that, all client/server communication is via PPL. FMS II does not use terminal emulation for any portion of the user interface.

In order to accommodate our installed base, the same FMS II software also continues to support an implementation which places all three tiers on a 3000 or 9000 server. In this situation, a somewhat less capable version of the user interface is available on a dumb terminal or on a PC emulating such a terminal.

Thomas M. Wolpert, Senior VP-Technology, Mitchell Humphrey & Co.



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1996 Q 3	21,006	42,496	3,863	18,226	83,865	169,456
1996 Q 4	15,485	52,036	8,486	56,416	99,091	231,514
1996	72,915	183,907	22,129	140,394	266,675	686,020

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**M**inneapolis Minn.-based Allina Health System is a not-for-profit health care provider serving people living in Minnesota, western Wisconsin and eastern North and South Dakota. They own and manage 19 hospitals, seven nursing homes, employ over 21,000 people and cover more than 1 million members in their Medica health plans.

When their doctors need information on the health of patients, they have a bag-full of tools they can use. When Allina marketing and finance personnel need information to determine the health of the company, they use Cognos' PowerPlay Server Web Edition 5.5.

"We use it to dissect information coming from other hospitals," says Casey Kirt, a systems integration

specialist from Allina. "If hospital 'A' has 1,000 patients in a certain location and we only have 200 we want to know why."

PowerPlay Server Web Edition is designed to provide Web browsers with the ability to manipulate multidimensional data through a Web server connection to a relational database or other OLAP sources, like Essbase and Express. It is a zero footprint product, with no client-side plug-ins required.

All processing is done on the server and the generated Web pages contain only HTML, JavaScript, and .GIF graphics. PowerPlay Server Web Edition runs on NT and supports IIS and Netscape servers.

Web Edition 5.5 adds distributed processing and load balancing by using a separate, central dispatch server for better performance and scalability across multiple servers and ensuring that processing is conducted on the least-occupied server.

Cognos' director of product marketing, Tom Camps, says that scalability and deployability are leading the drive behind the new version of PowerPlay, making it "our most successful new product launch ever." He explained that this is the first version of PowerPlay to

add support for UNIX servers and maintain support for NT. This allows for multi-tier mixing and matching of both platforms where appropriate. Administration is done with a Java-based application that allows for server supervision from multiple platforms.

PowerCubes are PowerPlay data sources. Users have cube-to-cube drill through capabilities for access to the entire scope of data anywhere within their enterprise. Allina's Kirt says that his staff uses another Cognos product, Impromptu, to pull data from PowerPlay and create web-based PowerCubes which managers and casual "data tourists" use for both daily access and monthly trend analysis.

Asked what he may want to see added in future releases, Kirt added he would like to be able to "put a wrapper around it," by adding customized logos and graphics to what the users see.

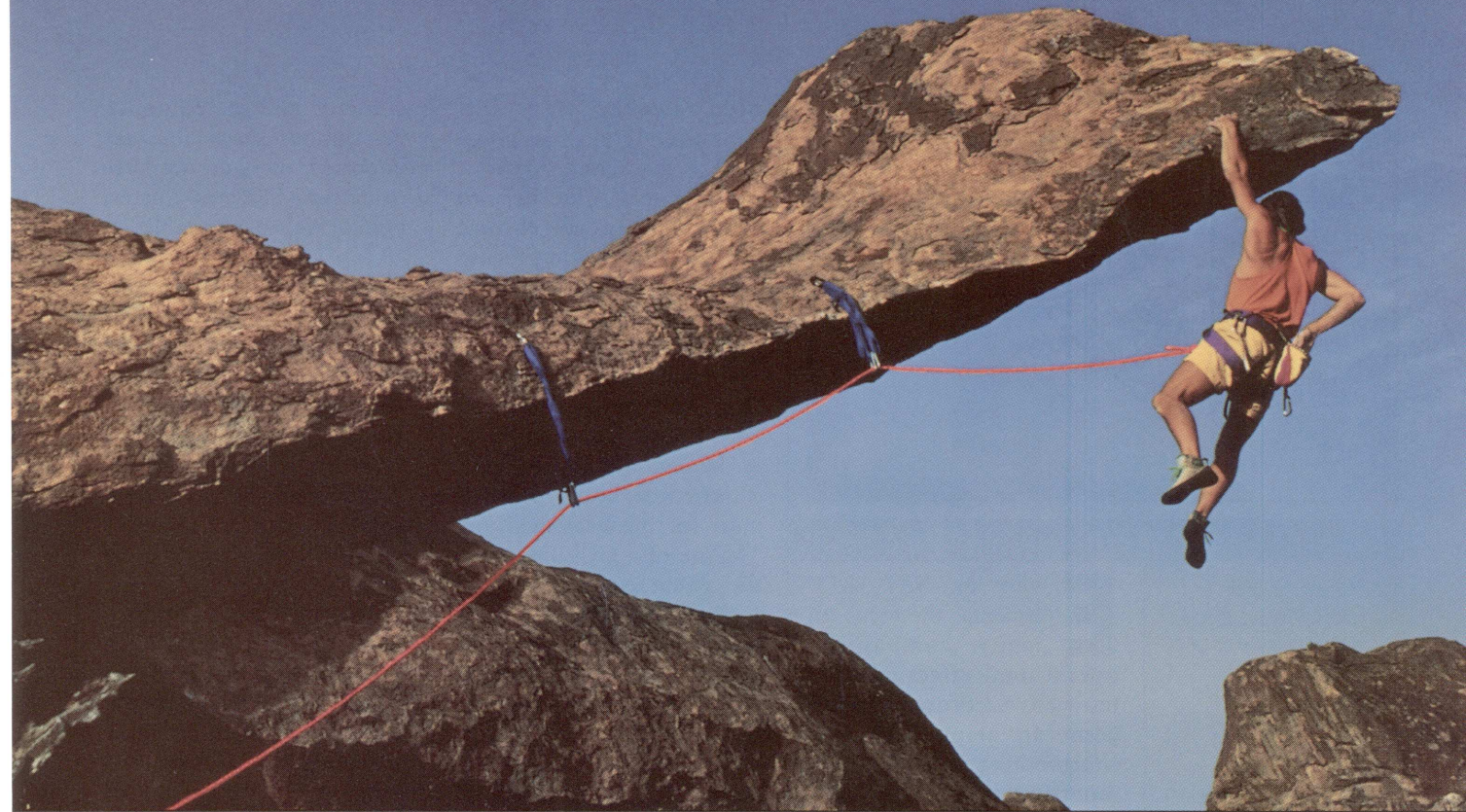
Camps added that version 6.0, available soon, will feature an enhanced user interface.

*Ken Deats,  
Associate Editor*



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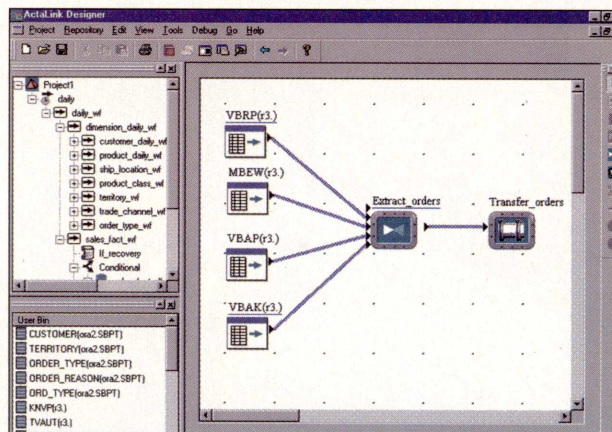
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**E**ven as SAP R/3 becomes the focus of many companies' operational effectiveness, too many users are trying to come to grips with the shortcoming of its limited reporting and data extraction tools. Most companies have discovered that building data warehouses from SAP R/3 is a complex, costly and time-consuming process.

Acta Technologies (Palo Alto, Calif.) wants to ease the pain data warehousing managers feel during that process with ActaLink for SAP R/3, the first extraction, transformation and loading tool designed specifically to build data warehouses from SAP.

"I saw from my background in the business integration world that reporting directly against the database

didn't work," says Jeff Coombs, Acta's vice president of marketing. He adds that the real solution is to build a data warehouse which, when having to use SAP's ABAP coding, is a "lengthy and difficult process."

Coombs explains that ActaLink extracts data from SAP, transforms and cleanses the data and loads it into a data warehouse or data mart for business analysis. The use of a GUI minimizes the coding required.

It generates optimized ABAP/4 code and extracts data through the application layer. "We're the only vendor to do that." It also can merge data from ODBC-compliant databases, Oracle, Informix, Microsoft SQL server, Sybase and flat files.

Acta provides pre-configured data marts, called Rapid-Marts, that address common business needs like sales and financial analysis and a graphical interface called ActaLink Designer which allows a user to define data mapping and transformation rules.

Data mapping and transformation rules are stored in the Metadata Repository. When importing metadata from SAP, the Metadata Repository is populated with a list of logical tables,

columns and their English descriptions. Once tables are imported, users do not have to discern between cluster, pool or transparent tables.

Janssen-Ortho, Inc., a Toronto, Ont., Canada-based wholly-owned subsidiary of pharmaceutical giant Johnson and Johnson, has been using SAP R/3 for almost a year. They are "terrible at reporting and data extraction," says Rick Sommerkamp, the manager of data warehousing at Janssen-Ortho.

Having already written ABAP code to generate a data warehouse used for sales analysis, Sommerkamp looked for alternatives. He started using ActaLink to run ad hoc and special requests against SAP. Plans are in the works to gather sales data from wholesalers which will allow them to analyze data at the retail level, an ability they have never had before.

Asked for recommendations on what should be added, Sommerkamp said "It would be nice to know what table you need. It's a difficult process to find the table. Someone should produce a metadata library or data dictionary. That would make everyone's life easier."

*Ken Deats,  
Associate Editor*



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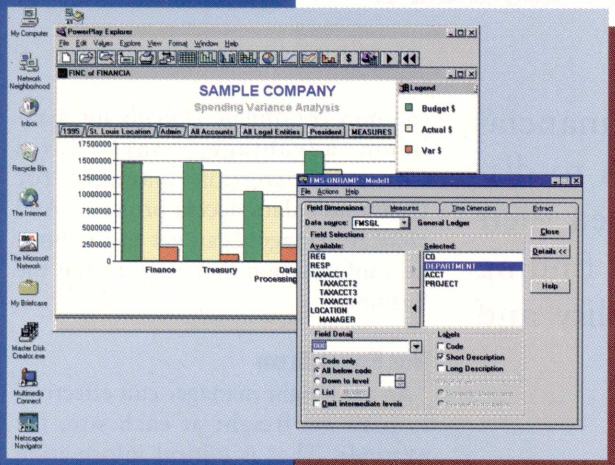
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# ERP Helps To Pay The Freight At Quantum

TELECOMMUNICATIONS, manufacturing and financial services companies are using data warehouses to discover end users' buying habits and to sharpen their marketing campaigns. Financial experts are finding value in better understanding their profitability and cost structures by using a *virtual warehouse*.

## S.R. Rodefer

**Q**uantum Corp. (Milpitas, Calif.), a \$5.8 billion diversified mass storage company, set up a *virtual data warehouse* by making transaction and operations data from its Oracle Enterprise Resource Planning (ERP) system available to managers, upon which they could base solid decisions. Business systems analysts figured out the users' needs for information and set up queries to ferret out that data, while regional IS programmers/analysts offered technical help.

### THE POWER OF TWO

The transaction information from the Oracle ERP system database is copied from a HP 9000 T600 enterprise server to a second server — the virtual data warehouse — on a daily basis. Quantum's operational users access the warehouse to obtain such information as inventory, shipment scheduling and purchase order updates at the global business operation sites. The virtual data warehouse is *one of two systems* fed by the ERP system. The other — an information warehouse — contains summarized infor-

mation on such things as Quantum's sales orders, backlogs, shipments and point-of-sale intelligence that lets the company monitor inventory levels.

On the ground, the virtual data warehouse has enabled air freight managers at Quantum's global business operations to act decisively because they can evaluate their inventory with one computer query. A manager who took half a day to run 15 reports and hand-load them onto an Excel spreadsheet now gets the same work done in 15 minutes. "People managing inventory at each of the nine business operations' sites

can now coordinate globally for maximum advantage," says Kevin Conway, program manager for Quantum's data access project. "And tactical managers can get to the business information they need to run the business."

### NOT FLYING BLIND

"An air freight manager can effectively plan air freight at each site, for example. That is critical information that lies behind the tactical, month-to-month, week-to-week decisions that are key to the operation's success," Conway says. The air freight shipments can be delivered as promised, pleasing the customer. And customers like HP, Dell, Compaq and Gateway get their PCs with just-in-time delivery so they don't have to deal with backed-up inventory in their warehouses.

"We're able to do the job more efficiently and with more confidence," Conway says. Users receive training and have a lesser need for IS support to obtain the information they need, unlike most global companies with 120GB databases. The data is simplified and put into business terms by applying NoetixViews from Aris Software, Inc. (Bellevue, Wash.) and BrioQuery from Brio Technology, Inc. (Palo Alto, Calif.). Quantum has achieved a ratio of one programmer/analyst to 250 users — a ratio Conway called unique, especially compared with the company's ratio of one programmer to 50 users in the virtual data warehousing operation a year-and-a-half ago.

QUANTUM will have a larger *virtual warehouse* if their \$300 million bid to acquire ATL Products goes through.

Calling it an opportunity to "coalesce all the autoloader business in Quantum into a single entity," ATL president and CEO Kevin Daly touts the "one-stop-shopping" potential noting that autoloader customers will gain a single-vendor migration path.

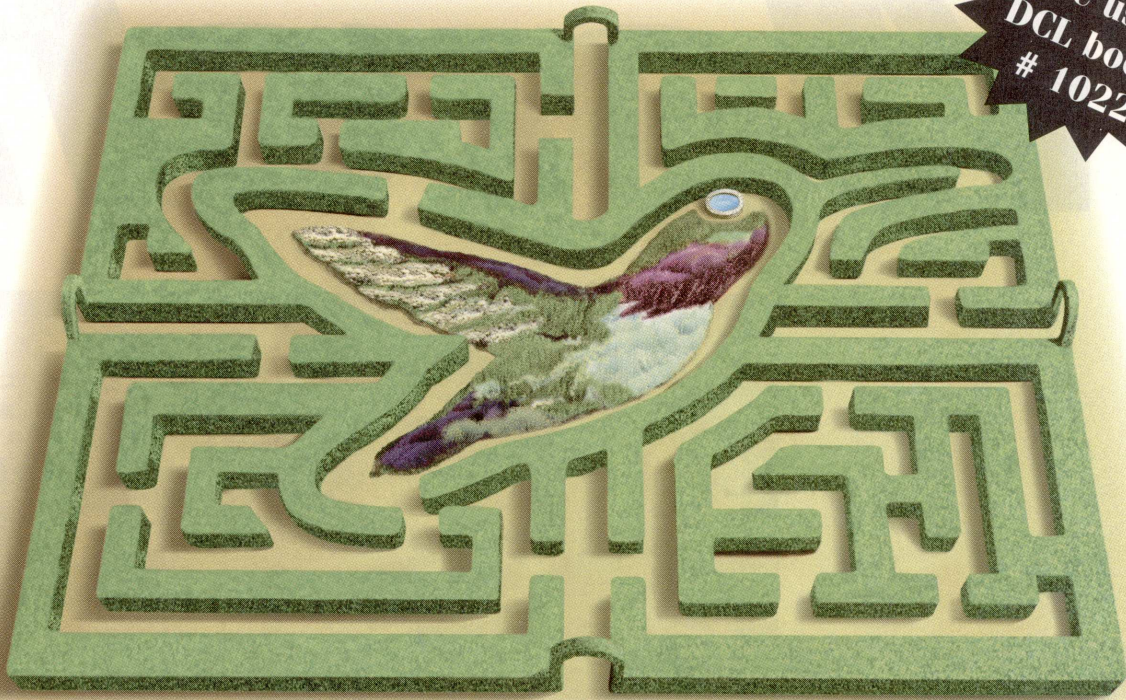
—Ken Deats

S.R. Rodefer is a writer with the Washington News Bureau.



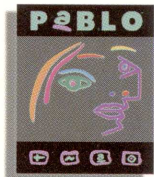
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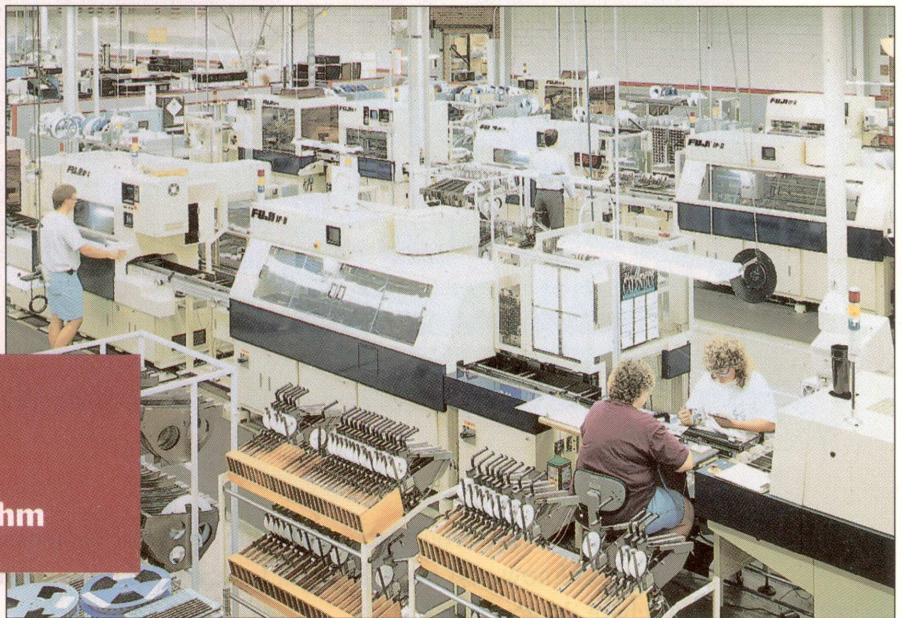
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# the MRPII March

## Kimball Electronics Group Steps To A New Rhythm



*At any given time, KEG's Jasper facility may have 500 open orders in various stages of production for customers in the automotive, defense, aerospace, telecommunications, computer and medical industries.*

**Bruce Reinhart**

The Kimball name first earned widespread public recognition over 30 years ago for its musical electric organs. Currently, Kimball Electronics Group (KEG) operates three facilities to manufacture its products, including circuit boards, multi-chip modules and semiconductor components. Prior to 1992, most of their IT services were provided by the parent company, Kimball International, Inc. As the technical needs of the various Kimball International divisions and facilities

became more specialized, these IT services became progressively decentralized.

KEG used an IBM Copics system for twenty years. This was a loosely-integrated system, characterized by the addition of numerous programs developed in-house as the needs arose over the years. Internal developers customized Copics with company-specific scripts for order entry, master scheduling and shipping. To bring a what-if planning capability to the legacy MRP system, company devel-



opers created two separate instances of the Copics system on the main-frame.

#### **TEST ANXIETY**

The second instance was for modeling and testing the impact of customer changes. This was a cumbersome process at best, involving a number of steps. For each test it was necessary to refresh the test system with the existing production data, return to the test system and enter customer changes to simulate order increases. Because this was a batch MRP system, the simulation could not be run until the evening. It was a minimum of 24 hours before data was available.

For the company's material planners, also responsible for day-to-day production MRP activities, imposing the additional analysis meant taking three days to a week before they could finish analyzing test data and spot problem areas — obviously a lengthy and painful process. And Kimball's suppliers are now calling more frequently with change order requests and asking corresponding questions about how those changes affect the scheduling of their orders. Taking a week to get back to a customer with that information was the norm in 1992 — in 1998 it's usually fatal.

Despite the advances of the MRP, it was obvious that supplementing the existing IT system would not be straightforward. Although plans for upgrading to a new MRPII system were already in the works, the constant pressure of the change order situation increased the urgency of implementing a successful solution. So, KEG designed an IT environment based on the realization that the company is effectively a branch of the manufacturing plants of every customer.

#### **CH, CH, CH CHAIN-GES**

The IT group purchased Rhythm, a supply-chain planning application from i2 Technologies and decided to extract what services they could from Copics by interfacing it with Rhythm.

At that time, the plan was to install Rhythm specifically for the purpose of scheduling shop floor operations. A healthy mix of disciplines that included business system analysts, developers and master schedulers were represented on the implementation team.

Their consensus was that advanced scheduling capabilities needed to be an integral part of the system. At the time, the team wasn't ready to consider using Rhythm's what-if simulation capabilities. However, as they worked through the different situations and became more familiar with the supply-chain planning approach, the value of what-if planning became very clear and, in fact, became indispensable.

Interfacing Rhythm with Copics was relatively simple because the process required only a one-way extraction of data from Copics, not feeding it back in. With i2 support and consulting, the team developed the needed interfaces within two weeks. The results were surprising: it was possible to load and run simulations and have reports within 10-15 minutes, in some cases enabling completion of customer requests within the hour.

This initial experience with Rhythm proved to be the foundation for the current IT system. In designing the migration to an MRPII plan, the team selected Avalon System's CIIM application to work in harmony with Rhythm. While there were challenges to the upgrade, developers' familiarity with Rhythm made writing interfaces for funneling data from CIIM to the various planning aspects a fairly simple matter.

As it evolved in 1994, KEG's new MRPII system was a major leap forward in several respects apart from the primary goal. The hub is Avalon's CIIM 8.6 running on a dual-CPU HP 9000 Series K450 with Oracle's RDBMS. Several additional HP servers and workstations were eventually purchased for various applications.

KEG user workstations run Windows 95 and a shareware Telnet

application called *QvtNet* for VT220 emulation to the CIIM application over several 10 Mbps and 100 Mbps Ethernet segments. HP's GlancePlus monitors the HP servers and the network is monitored with a PC-based tool called SNMPC and various home-grown Linux applications. KEG's IT team chose NetWorker from Legato Systems, Inc., as the enterprise backup software and a StorageTek 9714 tape library provides several DLT tape drives and 100 tape capacity for backing up all UNIX, NetWare and NT servers.

As it is being used, the Rhythm application is interfaced tightly with the CIIM system. The company also makes use of various other tools to analyze Rhythm data. Besides the standard Rhythm reports, users extract files and download them to Microsoft Excel and Access; Cognos Impromptu is frequently used for ad hoc report preparation. The information is used by the order fulfillment group, master scheduler, production planners and material planners to assess the impact of customer change order requests.

KEG's other facilities in Burbank, Calif. and Reynosa, Mexico are poised to deploy similar systems. These locations are running CIIM on HP servers (only the Jasper facility is using Rhythm for scheduling and what-if simulations). Even though the three facilities' MRPII systems are currently independent of each other, there is a good exchange of information and mutual support between them. Kimball International provides the wide area network which connects the U.S. and Mexico locations with T1 frame relay links.

#### **GOOD VIBRATIONS**

Customer service representatives have significantly improved their response speed and accuracy. Planners can develop ad hoc reports containing basic information within minutes after plugging in the specifics of a change order, and in hours rather than days provide customers with detailed information on the schedul-



# HEWLETT-PACKARD AND MICROSOFT OFFER MID-MARKET DATA WAREHOUSING SOLUTIONS

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## WHAT IS A MID-MARKET DATA WAREHOUSE?

Information is a strategic business asset and a data warehouse can help your company utilize that information to make better decisions, faster. Until recently, only the largest corporations have been able to create data warehouses because of the complexity and high investment required. In contrast, a "mid-market" data warehouse is a flexible information resource that requires a low investment and is user-oriented, high-volume, and localized. Examples include branch banking, insurance agencies, retail stores, manufacturing operations, and marketing campaign management. A mid-market data warehouse has these characteristics:

- **Minimal implementation requirements:** It is easy to implement and is a low cost investment.
- **Low operational requirements:** High-cost systems personnel are not required to operate the system.
- **Faster deployment:** Typically, a mid-range data warehouse requires only weeks for implementation, not months or years.
- **Compatibility with central IT administration:** A localized system that is monitored and managed from a central location.

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When choosing a system for your data warehousing needs, you must consider system performance, capacity, expandability, high availability, and of course, system cost. HP is a recognized leader in building enterprise data warehousing solutions for hundreds of major corporations, worldwide. Historically, most data warehouses have been created on a hardware platform running the UNIX® operating system. This is changing rapidly as the hardware platform running Microsoft® Windows NT™ Server and SQL Server becomes more powerful while remaining at a very modest price. A prime example is the HP NetServer. It has the highest benchmark performance results of any Windows NT server in the industry and has a proven track record for scalability, manageability, and high availability. Together, HP and Microsoft offer a mid-market solution to get your data warehouse up and running quickly and cost-effectively:

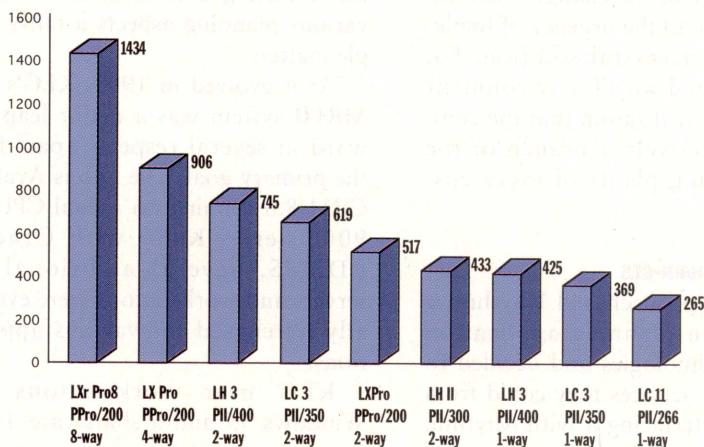
- **HP NetServer Implementation:** HP NetServers are low-cost, high-availability systems that rapidly handle large quantities of data. Because HP NetServers run Microsoft Windows NT, they fit right into your PC environment and do not require systems experts to run them.
- **Microsoft SQL Server:** Microsoft SQL Server is a scalable, high-performance relational database management system. It is unmatched in its ease of use and integration with Windows NT Server and Microsoft's BackOffice family of software. This means lower cost solutions for you.
- **HP Consulting:** HP's professional services help you put it all together. According to industry watchers, HP has one of the largest groups of experienced data warehouse consultants in the industry.

## HP NETSERVERS DELIVER HIGH PERFORMANCE AT A MODEST PRICE

HP offers a wide range of HP NetServer systems with price, performance, capacity and high availability features to suit a spectrum of business needs. The chart below shows the performance of selected HP NetServer systems running Microsoft Windows NT.

### ServerBench Peak Transaction Per Second

This chart is based on a ServerBench study conducted by Ziff Davis labs. The bars represent the peak transaction-processing rate for each system. There is a significant performance differential, about 5.5 times, between the LC II single-processor system and the LXr Pro8 8-way symmetric multi-processing system.





The new HP NetServer LH 3 offers unmatched speed and server capacity at a breakthrough price. The HP NetServer LH 3, with dual CPUs, is capable of performing nearly 3 times the transactions per second of a single Pentium Pro 200 MHz based system. It demonstrates a superior ability to quickly and efficiently process information and transactions with Windows NT Server and popular application software including Microsoft's Internet Information Server and Microsoft SQL Server.

### **MICROSOFT AND HP PROVIDE INTEGRATED DATA WAREHOUSE SOLUTION**

The key word is integration. The administration tools and security models of Microsoft SQL Server and Windows NT Server software are made for each other. Along with the Microsoft BackOffice family of software, they deliver excellent performance and scalability on HP NetServers. Each application integrates with the other to keep information moving and different hosts talking. And users can access data easily with their favorite applications like Microsoft Excel. Also, dozens of industry leading vendors offer data warehousing tools that integrate with Microsoft SQL Server.

HP is long known as an industry leader in management solutions. HP NetServer systems come standard with the top management solutions in the market today. This results-oriented package includes tools for faster deployment, increased availability, and easier remote business administrations. HP's strategic partnerships with leading management providers also play a key role in your success by simplifying backup, security, clustering, and remote management.



### **HP HELPS YOU PULL IT ALL TOGETHER**

There is more to a complete data warehouse solution than choosing the right products, no matter how reliable and well designed they might be. You need a partner that can assist you at any stage, from design and architectural planning to implementation and long-term service and support. HP is a world leader in everything you need for a complete, robust, and scalable solution—consulting, proven server and network management technology, outstanding service and support, global reach, and expertise in Microsoft Windows NT Server and Microsoft SQL Server.

Hewlett-Packard is recognized as an industry leader, with over 10 years experience, in providing enterprise-wide data warehousing solutions for the UNIX environment and now, HP is taking leadership in providing data warehousing solutions with Windows NT Server and SQL Server. Choosing HP lowers your risks and positions your organization for long-term success.

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ing and pricing impacts of their requests.

The improved performance has also been noted outside the company. Last fall, KEG was awarded the 1997 Overall Customer Rating Service Excellence Award for Contract Electronics Manufacturers in the large company category. That award, based upon input from customers of electronic manufacturing service companies and presented by Technology Forecasters, Inc. and Circuits Assembly Magazine, constitutes a vote of confidence from our customers.

Other divisions within Kimball International are moving to make similar IT system upgrades. In fact, another division, Kimball's Jasper Furniture Company, has installed i2's Rhythm for their MRP and supply-chain functions. At KEG's Jasper facility there are plans on the table for implementing a manufacturing execution system (MES) and setting the stage for a 24x7 operation. During these upgrades we will also upgrade

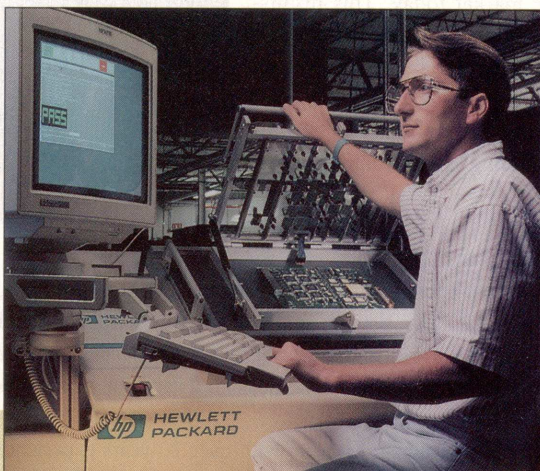
the Rhythm software.

The benefits of Jasper's MRPII system were immediate. In the warehouse, inventory has been cut by 59 percent at the same time we have seen a 50 to 60 percent increase in sales.

Of course, in this industry you're never caught up to the point where you can relax. If IT organizations are doing a good job, the company will be able to fill more orders — even though individual orders will be for increasingly complex products for increasingly unpredictable markets.

For these reasons, KEG and every other company in the electronics manufacturing services sector must keep a vigilant watch on the direction of IT solutions. Within KEG's IT organization it's possible to have a stronger sense of security now that we have effectively factored the unpredictability of the market into our IT solution. ♦

*Bruce Reinhart is the materials manager for the Kimball Electronics Group.*



*The architecture of the HP 3070 Board Test Systems in use throughout KEG's 200,000 square foot manufacturing area enable the Test Engineering Department to develop new test software quickly, using Windows-based development features.*

## DELIVERING ON PROMISES

IT'S ONE THING to streamline manufacturing planning, it's another to physically deliver the goods. Electronic components, such as those that Kimball manufactures under QS9000 requirements today for the auto industry, must adhere to even more stringent requirements.

The Test Engineering Department develops in-circuit and functional tests for the electronic assemblies manufactured by KEG. Production testing at KEG is based on the HP 3070 family of board test systems which are used to detect assemblies with solder shorts, open circuits and missing or defective components. Nearly a dozen of the HP 3070s are currently in use in this role. Later in the manufacturing cycle, functional testing ensures that each board operates correctly and meets detailed application specifications. KEG has upgraded its HP board test systems for in-circuit tests over the years, boosting production rates as necessary with test systems that operate faster, can be changed over more rapidly for different boards and new software features that improve operators' proficiency.

Several times a day on high-volume production lines, test operators need to test different circuit assemblies like those produced for automotive and computer markets. KEG minimizes the time required to change-over the test stations for the different assemblies. Operators replace test fixtures that electrically connect each different device under test (DUT) to the HP 3070. The operator also selects the appropriate test program for the DUT using a Windows-based application. To simplify and streamline the change-over at KEG, the software verifies that the test program selected matches the test fixture the operator installed on the HP 3070. Relying on these and other features, the change-over is quick with operators ready to test another batch of assemblies in under five minutes.

— Chris Luebbehusen, KEG Test Engineering Manager



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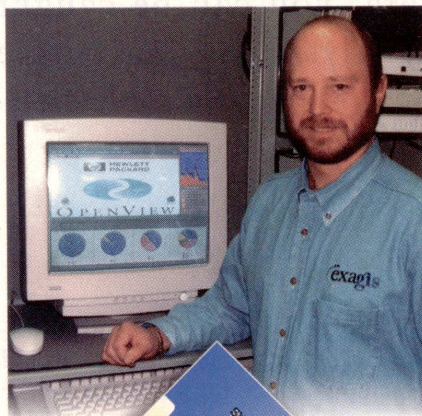
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# Clean-Cut Warehousing

## HP Comes Clean On Their Reseller Database

**DATA WAREHOUSES** can be like the Trojan Horse. If their enormous and sophisticated data stores are filled with inaccurate or duplicate data, you can be caught unaware with misleading analysis and inaccurate reporting. Even a \$40 billion company like Hewlett-Packard is no exception.

### Sarah Juon

**W**ith 100,000 records a day streaming in via electronic transmission from HP's Wide Area Network (WAN) of resellers around the world, cleaning data in HP's Oracle database (running on top of HP-UX 9.x and 10.x) was imperative. These customer records arrive in any number of non-standard forms: with company names spelled in different ways; addresses outdated or incorrect; individual names misspelled; titles missing; and run-of-the-mill typographical errors. As a result, the database was polluted with duplicates and inconsistencies and there wasn't any efficient way of ferreting these inaccuracies out.

"The driving force for that initiative," says Lenka Rozporka, the HP IT engineer leading the clean-up job, "was to find a way to consolidate and clean up customer data coming from our resellers. We wanted to find out which divisions were buying what and who exactly was buying HP products. We also needed accurate information about a company's address and contact names." But with the raw data, there was no way to accomplish this. "Various sources

had AT&T entered in about 50 different [ways], meaning they would end up in 50 different brackets for the amount the company spends. This made it quite difficult to total the whole amount AT&T spends."

#### NAME CALLING

Rozporka reviewed data cleansing software by i.d.Centric data quality tools from Firstlogic, Inc. (La Crosse, Wis.). "I was familiar with Firstlogic's Postalsoft mailing software because we were already using that for address correction and merge/purging in other departments." After an initial presentation, proof-of-concept and verification of results, Rozporka installed i.d.Centric for business name and title correction, standardization, enhancement, matching, and consolidation. The initial implementation took less than three weeks. Firstlogic also brought in specialists who took the process beyond the normal training procedure, working with HP to fine-tune the solution.

Using i.d.Centric, several tables were implemented to perform data cleansing that would catch all name and address format variations (upper case, lower case, special characters,

abbreviations) and data parsing to identify business names related to one company but not all located at the same address. i.d.Centric's matching and consolidation technology helped bring together the cleansed business names to eliminate duplicate customer records. After four months, Rozporka is convinced that there's been "an absolute gain from using the data cleansing tools from i.d.Centric."

HP's channel marketing organization will now be able to generate accurate reports based on regrouping of data that allows them to pinpoint where sales are coming from—by customer, reseller, region, and other marketing sectors. From these reports, HP's marketing organization can accomplish long-term strategic planning and make better business decisions.

#### LEAN, MEAN AND CLEAN

The success of this data quality implementation has inspired HP to look at cleaning warehouse data as they migrate it to newer machines. "When we standardize our warehouse data," says Rozporka, "we expect to find at least 10 to 15 versions of each business name. We hope to catch all the variations with the data cleansing tools."

Given HP's vast technological resources, did they at any point consider writing their own data cleansing software program? "First, it's a lengthy process, requiring experience in writing software. It's difficult to hire people who can write exactly what you want, especially since we don't have the experience in how to design the software and how to program. Second, it's not really cost



effective to spend hundreds of thousands of dollars to write software that you might not be able to market somewhere else."

Because HP's solution did something "most companies don't use i.d.Centric's solution for," the biggest hurdle was finding out exactly what the software is capable of, recalls Rozporka. "We needed to customize the product. There are various places where you can use some selection logic in i.d.Centric's technology. It

was crucial for us to find out the product's limitations and advantages in the beginning, before we actually used it."

According to Rozporka, everyone should be busy cleaning up their data warehouses. "Because data warehousing has evolved so quickly and there is need for massive amounts of information, it seems that everybody can store the information." But Rozporka adds rhetorically "Is it accurate and clean? Are all the totals totaled cor-

rectly because the data is clean, or are we losing visibility of some data because the business names are not standardized? It has become increasingly valuable to companies to obtain clean, solid customer data," Rozporka concluded. "That's why you see companies like Firstlogic bending over backward, retooling their technology to adjust and exceed expectations." ♦

*Sarah Juon is a freelance writer based in Rhinelander, Wisconsin.*

## SIX WAYS TO CLEAN YOUR DATA

DATA QUALITY IS GETTING more recognition in the market, because many companies realize too late, the dirtiness of their data. Often entire projects will fail because it wasn't incorporated into the solution. With "dirty data," the ability to create a complete customer view is impossible — which affects other things in the data warehouse like data mining and data modeling. It's important to remember the need for data quality stretches further than just data warehouses—*data quality is essential in any project involving customer-centric information!*

**1. PARSING** Parsing locates, identifies, and isolates individual data elements in unstructured data. Components may include a customer's first name, last name, title, company name, street address, city, state or ZIP Code. Parsing makes it easier to correct, standardize and match data because it allows you to compare individual components, rather than long strings of data.

**2. CORRECTION** Correction can be defined as "intelligently verifying, scrubbing and appending data based on a set of reliable secondary data sources." Correction is the building block that sets i.d.Centric apart from many other companies in the data quality market space. Many of our competitors can only parse and identify the customer record components, whereas i.d.Centric's tools can verify that data components are correct, such as a street or city spelling or ZIP code.

**3. ENHANCEMENT** Enhancement is the addition of new data and appending of missing information. This information includes data like age, household income, presence of children, marital status and number and types of credit cards

owned. Missing information that may be appended includes: apartment numbers, missing address elements, telephone numbers, latitude/longitude information, county codes, MSA and political districts.

**4. STANDARDIZATION** Standardization is the fourth building block in the data quality process. This step allows you to convert information into a preferred and consistent format. Standardization allows fixes such as inconsistent abbreviations (IBM, Int'l Bsns Mach, International Business Machines), inconsistent name data (Robert, Bob), unusual titles (Graduate, Realtor Institute) and misspellings and variant spellings (Kwik, Quick, Quik). This building block is important because it helps facilitate better matching.

**5. MATCHING** Matching is the most important step in the customer data quality process. Matching allows identification of similar data within and across data sources. This is the heart of data quality—using cleansed information and match standards, eliminating duplicate representations and consolidating all information about each individual customer.

**6. CONSOLIDATION** Once locating the matching records in the data, relationships between customers can be identified and a consolidated view can be built. This is consolidation, the final critical component of successful one-to-one marketing and data quality building blocks. Consolidation allows you to gain a clearer understanding of customers.

It's imperative to realize that these blocks are most successful when used together.

—S.J.



# The Hub Of IT

AS THE SIZE and number of these OLAP data stores continue to rise, the challenges of untangling hand-coded applications used to populate warehouses rise in kind. The resulting "spaghetti" is an unappetizing chore for IT. Unless they know about Enterprise Application Integration (EAI).

## Brian Donnelly

**A**ccording to Forrester Research (Boston, Mass.), a large company now has an average of 3.8 data warehouses or data marts. In two years, this is expected to grow to an average of 5.7. With the growing number of packaged applications and data sources — many on HP platforms — companies are increasingly faced with "inter-application spaghetti" — a mass of point-to-point interfaces that need to be managed, maintained and re-coded each time an application changes.

Most commercial tools simply cannot scale to cope with the increasing demands for new application inter-

faces, faster warehouse population and refresh, support for multiple, dependent marts and better links to operational systems. The key to untangling the inter-application spaghetti lies in Enterprise Application Integration (EAI).

### EAI'S EMERGING EFFECT

Enterprise application integration is a rapidly emerging market. IDC (Framingham, Mass.) estimates that worldwide IT spending in 1997 was \$751 billion, while Forrester estimates that 30 percent of this total (or \$225 billion) was spent on the design, development and maintenance of integration solutions for enterprise applications. In other words, this is a serious problem that affects many organizations worldwide.

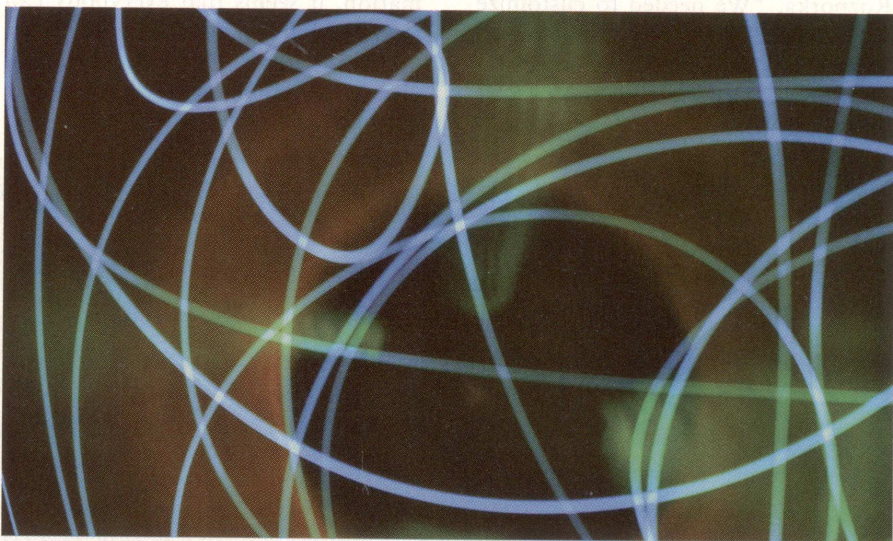
Part of the confusion lies in the fact that there are radically different approaches to application integration, including plug-in application-to-application interface programs, message brokers and transformation engines.

In addition, there are several dimensions to consider: data transportation vs. data transformation; batch delivery vs. real-time; transactional vs. informational data formats.

In an ideal world, you want it all: transportation *and* transformation, batch *and* real-time, OLTP *and* OLAP integration, but few solutions can incorporate the breadth of these requirements. The only way to accomplish this is through a *hub-based EAI approach*.

The concept of a central hub is not new. Before deregulation in 1980, the U.S. airline industry nearly collapsed under the weight of its unmanageable infrastructure of city-to-city interconnections. The advent of the hub model was a breakthrough in cost reduction and logistical simplification that enabled airlines to scale as never before. Cisco also adopted this strategy with its hub products, which interconnected the physical network in ways never before possible.

Global 2000 IT organizations are

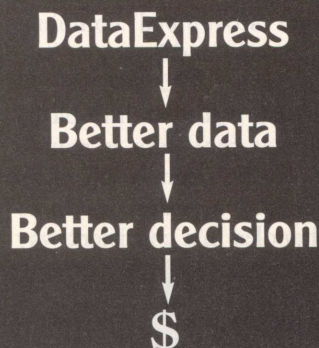




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experiencing similar pressure interconnecting enterprise applications due to the mushrooming number of packaged applications and data warehouses. That's why they too, are turning to a hub-based model to create a centralized, manageable, scalable solution for interconnecting enterprise applications. This approach dramatically speeds the development and deployment of new enterprise applications and reduces the complexity of the IT infrastructure, so organizations can meet and exceed the rapid pace of business change.

With the right EAI solution, companies can create an infrastructure that supports many IT initiatives, including legacy systems migration, loading and maintaining of data warehouses and controlling the flow of data between application systems like Oracle Financials, PeopleSoft and SAP.

The data warehouse requires that large volumes of clean historical data be moved on a regular basis from many operational systems into the warehouse(s). The source data is usually structured for On-line Transaction Processing (OLTP), whereas the warehouse accommodates On-line Analytical Processing (OLAP) formats. The source data must therefore undergo extensive aggregation and reformatting as it is transferred to the warehouse.

#### THE FOUR-STEP PROGRAM

There are typically four steps involved in populating data warehouses and marts:

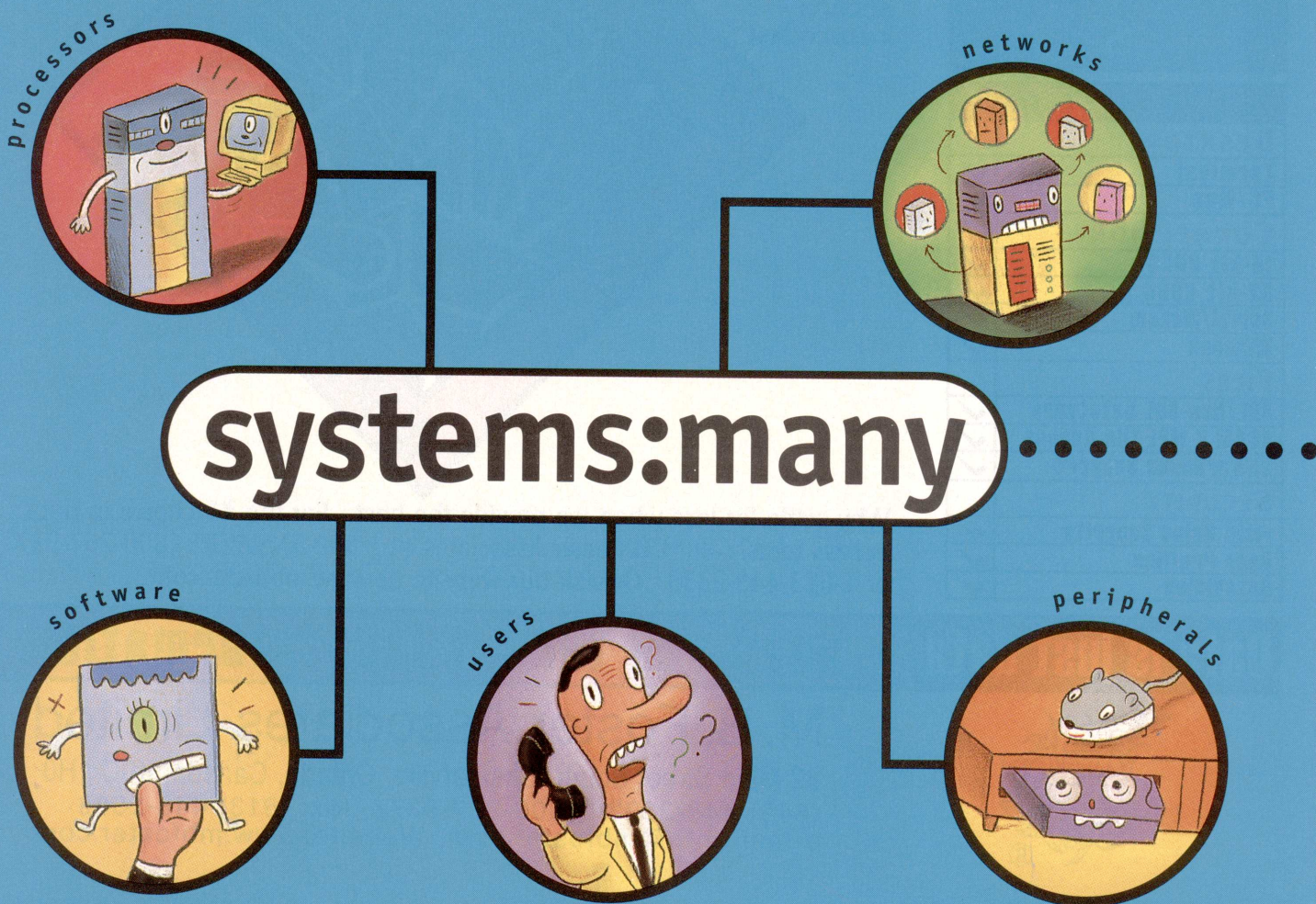
- source data extraction
- data cleansing
- multi-dimensional aggregation
- warehouse load

For each warehouse source, this usually requires the creation of cus-

tom software to do all four steps. Much anecdotal evidence also exists to show that some of the more complex aggregation processes can take as much as *50 hours of non-stop computation* to complete. For hand-coded programs, this implies a significant maintenance effort.

What's more, in a majority of cases, the data warehouse is being loaded with as much as 20 percent poor quality data, according to the META Group. Many companies have had no choice but to integrate and manage disparate products for data transformation and movement or worse, create 'stovepiped' combinations of data marts and legacy or new ERP application architectures.

The premise behind a hub-based EAI solution is that data is routed through a central location where all business rules and metadata reside, so all data is handled in a consistent way





that accurately reflects the underlying business processes. In essence, the hub acts as the heart of the network, pumping large volumes of data in from virtually any source, conducting complex transformations, aggregations, mappings and data cleansing techniques and then pumping the aggregated, transformed, cleansed data out to a multitude of targets, including data warehouses and packaged applications.

#### WHAT'S ALL THE HUB-BUB?

Because the hub is a live, run-time environment, the input and output can be easily scheduled according to business requirements. And should a system failure interrupt the process, it can return to the exact point in its operations prior to the failure. The sheer volume of data required for data warehousing and the complexity of the transformations needed to cre-

ate hypercubes and understand multi-dimensional formats necessitates a hub-based approach to simplify and speed the processing and improve the accuracy and effectiveness of data warehousing initiatives.

The value of a hub-based EAI solution is that it implements changes at an architectural level. Consequently, it's the first EAI approach to get to the root of the inter-application spaghetti problem, rather than just addressing the symptoms as point-to-point application integration products do.

The end result is an IT infrastructure that can easily and quickly adapt to future changes, including implementation of new enterprise applications, legacy systems migration and ERP integration, as well as industry and business developments like mergers and acquisitions, de-regulation and risk management assessments.

Because the hub is an open, vendor-independent approach, companies can add functionality through API plug-ins with other technologies in order to address the full range of EAI requirements, including real-time communications, data warehousing, data quality/cleanup, integration with enterprise management frameworks and direct database connectivity, providing the first complete enterprise application integration solution. ♦

*Brian Donnelly holds bachelor of science and master of science degrees in Computer Science from King's College, London and is the chairman and CEO of Constellar Corporation, which has developed and commercialized Constellar Hub, software used to manage data transformation and movement across enterprise application networks.*

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## Corporate Profile

# DELIVERING HIGH AVAILABILITY AND SCALABILITY FOR NT - TODAY

Today's end users expect - and deserve - 24x7 availability, especially for electronic business and operational systems. Of course, providing high availability isn't the only challenge facing DBAs; database systems also have to be built to scale. Cluster technology can help solve both availability and scalability needs.

Oracle's database clustering solutions on Windows NT range from low-cost workgroup and departmental two-node cluster solutions through multi-node enterprise-class clusters. Small organizations or workgroups can choose the economical, easy-to-use Oracle Fail Safe feature that is built into Oracle8 database servers. Organizations with greater scalability needs are more likely to opt for the Oracle Parallel Server option. Oracle Fail Safe relies on the Microsoft Cluster Server (MSCS) while Oracle Parallel Server supports MSCS and other scalable clustering technologies running on key partners' platforms such as Hewlett-Packard NetServers.

With a long track record in clustering on UNIX and VMS (Oracle Parallel Server dates back to 1989), Oracle has acquired extensive experience in implementing cluster solutions for business-critical applications. Oracle's NT cluster strategy is to enable customers to develop and deploy mission-critical applications on Windows NT clusters.

### ORACLE FAIL SAFE

Oracle Fail Safe is the low-cost, high-availability solution for Oracle databases on Microsoft Windows NT Cluster Server.

### WHY USE ORACLE FAIL SAFE

- High Availability:** Oracle Fail Safe provides fast failover of the Oracle Data Server during both planned and unplanned outages. When DBAs need to perform maintenance on one of the cluster nodes, end users can be redirected to the other node in the cluster. And by minimizing downtime, end users have continuous access to the information in the database, thus increasing productivity.

- Ease of Use:** Oracle Fail Safe is completely transparent to the end user; they need not know which node they are accessing, but simply that the database is up and the information is there. Oracle Fail Safe Manager makes the configuration and the maintenance of the failover system extremely simple for the DBA.

- Active/Active Configuration:** Unlike other failover systems that require one node to be idle, with Oracle Fail Safe both nodes in the cluster can be used to do real work. In case of outage, the surviving node will take over the workload of the other node.

- Low Total Cost of Ownership:** For organizations with a small IT budget, Oracle Fail Safe makes cluster technology affordable. First of all, the product is free. Second, the simple administration means that DBAs need no special training. And finally, the productivity of end users is enhanced by reduced downtime. All these factors improve the bottom line of a growing business.

### WHAT HAPPENS DURING FAILOVER

Oracle Fail Safe sets up the appropriate conditions under which the cluster software fails over to Fail Safe groups ("virtual servers" that you define) to achieve high availability of Oracle databases. For example, during server-node failure, the Oracle resources automatically fail over to the other cluster node. Client applications reconnect to the same virtual server after failover occurs, and any transactions that were uncommitted when the failure occurred are again automatically rolled back.

To detect a server failure, the cluster software periodically checks the status of all server nodes in the cluster and the resources they control. When a failure is detected, the appropriate failover policies are implemented. During server-node failure, users connected to the failed



## ORACLE PARALLEL SERVER

### WHY USE ORACLE PARALLEL SERVER

server will experience a temporary loss of service, but Oracle Fail Safe automatically restores services without operator intervention.

In the case of database failure or the failure of one of the nodes' required resources, the node attempts to restart the Oracle Data Server instance according to failover policy for that database. Oracle Fail Safe Manager allows the DBA to specify how many and how frequently attempts are made before failing a database over to another node.

Oracle Parallel Server is a multi-instance, multi-node database cluster solution that supports a variety of clustering technologies (including MSCS).

- High Availability:** Oracle Parallel Server offers the capability of application failover support, transparent to system users, by allowing transparent reconnection to a surviving node if a failure occurs.

- Scalability:** With Oracle Parallel Server you can take advantage of enormous computing power - well beyond what is now available with conventional NT machines. This power is available at extraordinary cost/performance levels, allowing existing applications to grow with your business and scale along with the total workload. This technology lets multiple, loosely coupled, clustered NT machines access a single database spread across large pools of disks, so it's easy to add nodes when a system reaches saturation.

- Manageability:** The appeal of Oracle Parallel Server for a DBA is that you can manage the system like a single database. Oracle Parallel Server option is managed from the familiar Oracle Enterprise Manager, which simplifies a variety of tasks. These tasks include starting Oracle Parallel Server and shutting it down, hiding the complexity of starting distributed lock manager (DLM) on multiple nodes, mounting and starting multiple instances on multiple nodes, and so on.

- Performance:** Oracle Parallel Server increases performance by sharing workload across a cluster. In addition, Oracle Parallel Query - a standard feature for Oracle8 on NT - works with Oracle Parallel Server and provides high-speed execution of a single SQL statement by distributing the work across the CPUs/nodes and dramatically improve performance for complex transactions such as decision-support queries.

### WHAT HAPPENS DURING SYSTEM FAILURE

With Oracle Parallel Server running, if one node becomes unavailable, users on the remaining nodes continue to do their work, while users on the failed node automatically switch to another node and continue processing. The remaining nodes automatically recover committed work on the failed node without intervention from the DBA.

### HOW CAN SEVERAL NODES WORK TOGETHER ON THE SAME DATABASE?

Oracle Parallel Server relies on advanced DLM so that updates (even multiple concurrent updates) are coordinated across the nodes of the cluster. The DLM itself uses fault-tolerant algorithms in its implementation to provide high scalability, high availability, high throughput, and speedy internal recovery from node failures.

Oracle Parallel Server also implements advanced cache-management techniques to increase reliability. Cache management coordinates cache information between different nodes in a cluster so that all copies of a data block impacted by database transactions remain identical.

### ORACLE FAIL SAFE AND ORACLE PARALLEL SERVER ON HP NETSERVERS

On June 3, Oracle announced the new versions of Oracle Fail Safe and Oracle Parallel Server for Oracle8. Oracle Fail Safe is currently available at no additional cost with both Oracle8 and Oracle8 Enterprise Edition, and is compatible with all existing HP NetServer Clustering Solutions. Later this summer, HP will release an Oracle-certified Clustering Solution optimized for Oracle Parallel Server.

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# Intelligent Storage

## No Need To Compromise Your Data Warehouse

IT MANAGERS ARE forced to compromise between the new business opportunities generated by data warehouses and maintaining normal business operations. Unfortunately, inadequate storage resources do not allow the two to operate effectively in parallel, threatening long-term success.

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**Philip Tsihilis**

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**T**o be most effective and provide the sharpest competitive edge, data warehouses must provide decision makers with a continuous, comprehensive and single vision of their entire business and leverage information from across the computing enterprise. Much of the information used in data warehouses is transferred between mainframe-based production systems and newer, open production systems. These data transfers, so vital to a successful data warehouse, can negatively affect the performance of the rest of the enterprise. They impact the network, take away valuable mainframe cycles and slow down computing operations.

In the past, storage technologies were not thoroughly scrutinized during the infrastructure design phase of data warehouse projects due to a general feeling that storage did not play a major role at this point of the project. In reality, the wrong storage decision made during the design phase has lasting effects on the success of the data warehouse. Inadequate Just a Bunch of Disks (JBOD) and other storage systems can't meet the demands of a competitive data ware-

house and can quickly lead to lost opportunity, lost revenue and business disaster.

Through *enterprise storage*, data warehouse architects are bringing together information from distributed computing environments while easing many potential operational and administrative "pain points." By leveraging an intelligent layer of storage-based software applications with industry leading hardware, enterprise storage shares, manages and protects this information and heightens the strategic value of most data warehouse environments.

### MULTIPLYING DATA MOVEMENT

Multiple host operating systems and data formats are the architectural norms for most data warehouses. Through enterprise storage, architects and integrators can consolidate all data storage needs for each CPU within the planned infrastructure (e.g., online transaction-based systems, data mining, data marts, OLAP) into one centralized location. Shared, centralized storage provides a dedicated path for data sharing and movement among those CPUs.

Through enterprise storage, users

can move and share information using a common data source. Bulk file transfers needed to refresh the data warehouse are done using high-speed connections to the enterprise storage system rather than slower network connections. This improves transfer speeds, keeps the data warehouse current and frees network bandwidth for other business-critical activities.

Managing multiple long-running queries can be a time consuming and intimidating task for even the most seasoned database administrator. Many data warehouse experts strongly recommend leveraging I/O from the host to the storage device. However, balancing I/O over multiple data paths through complex host-based logical volume managers and standard database tuning techniques suggests that system tuning will be a constant operational struggle.

### BALANCING ACT

Enterprise storage offers software functionality that dynamically balances I/O across all available host server channels connected to the storage system. By taking advantage of all available channels, this enterprise storage load balancing increases server access to the precious data residing on the storage system (regardless if the queries are random or sequential), greatly reduces the amount of manual query optimization required by the database administrator and maximizes the server and storage investment.

The value attributed to a data warehouse is derived by the currency of its information. To stay competitive, managers need to make decisions based on today's markets. Unfortunately, many data warehouses



are designed to rely on a weekly batch window for refresh. This window is continuously shrinking as routine procedures like backups and application testing take precedence over scheduled data warehouse updates.

#### Do You Copy?

Enterprise storage offers business continuity software that eliminates the need for a batch window for routine procedures. Data warehouse administrators can conduct more frequent OLAP and data mart updates using real-time copies of production data. These copies, which are made within the enterprise storage system, provide IT managers with the luxury of running several applications simultaneously. By scheduling multiple processes against the same data in parallel, enterprise storage effectively elimi-

nates the backup window and enables 24x7 availability for both data warehouse and production environments.

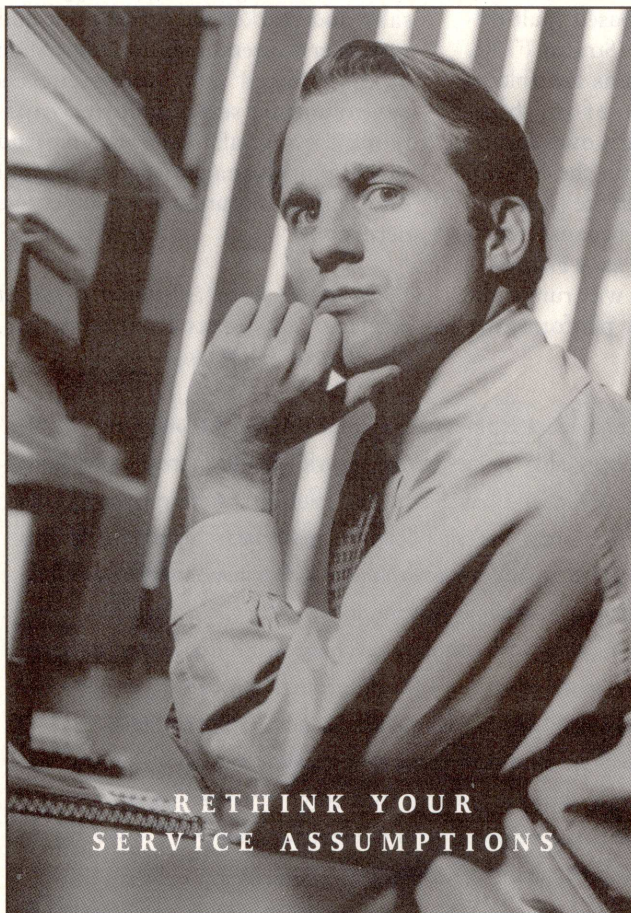
Enterprise storage goes a step further by mirroring production data to a remote data facility. This second storage system can be separated from the primary enterprise storage system by several feet or hundreds of miles. If one system becomes unavailable in the event of a planned or unplanned interruption, intelligent enterprise storage software will redirect the information flow to the other site. This further ensures that data warehouses will continue to be supported by real information around the clock, regardless of circumstance.

#### THE VISION THING

Enterprise storage provides a uniform information-centric data delivery plat-

form which impacts every component of data warehouse operations: time-to-revenue generation, application availability, query performance and timeliness of data. Through its hardware and software solutions, enterprise storage eases the management of information flowing from multiple data sources, keeps data fresh and current and provides 24x7 availability. By closing the information gap, data warehouses distribute one comprehensive "vision" to an organization at market speed and enables decision makers to act on today's information to ensure tomorrow's success. ♦

*Philip Tsihilis is senior product manager at EMC Corp.*



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# How High Is Up?

## Is 99.95 Percent Availability Enough?

FOR SOME ONLINE banking, electronic commerce, bond trading and telecommunications systems, unplanned network downtime can cost millions of dollars. For emergency 911 systems, it can cost lives. Previously, managers have turned to *High Availability* (HA), but what about Continuous Availability?

### Suzanne Reid

**A**t 99.95 percent availability, the best HA benchmark today, systems can be expected to produce 4.5 hours of unplanned downtime for a 7x24x365 network.

The most advanced of the availability architectures, *Continuous Availability* (CA) is extending the power of HP OpenView onto fault-tolerant platforms. This is critical because hardware is the leading cause of network failures. Based on HP's PA-RISC 8x00 CPUs and HP-UX, the Stratus Continuum family is the industry's first fault-tolerant OpenView platform. Stratus designs CA into its system architecture. For example, self-checking logic on each major circuit board detects and isolates failures. The duplication of processors, memory, I/O controllers, disks, power supplies and buses ensures that processing will continue should one component fail. Stratus systems achieve 99.999 percent availability which translates to five minutes of unplanned downtime during a calendar year.

Stratus has expertise in building reliability, portability, compatibility,

scalability, and interoperability into a standards- and UNIX-based fault-tolerant operating system (Stratus FTX), so all HP-UX applications are able to run, unaltered, out-of-the-box. Stratus had to pass HP's own certification tests and maintain the HP-UX Application Binary Interface (ABI).

This is important because when application software is written to conform to an ABI, it will run without recompiling on any platform that uses the ABI hardware.

Another goal was to bring to HP-UX the transparency of the fault-tolerant environment. This means developers do not have to write specific fault-tolerant operations into the software; the operations are incorporated automatically. Implementation work was done at the Stratus' Western Development Center, close to the HP development group in Silicon Valley, giving Stratus engineers direct access to HP developers.

The close cooperation between HP and Stratus extends across functions—from engineering to support to sales and marketing. As network and system managers address issues such as distributed and heterogeneous environments, self-monitoring capability is essential. The proactive and intelligent management of critical information resources is a competitive necessity. ♦

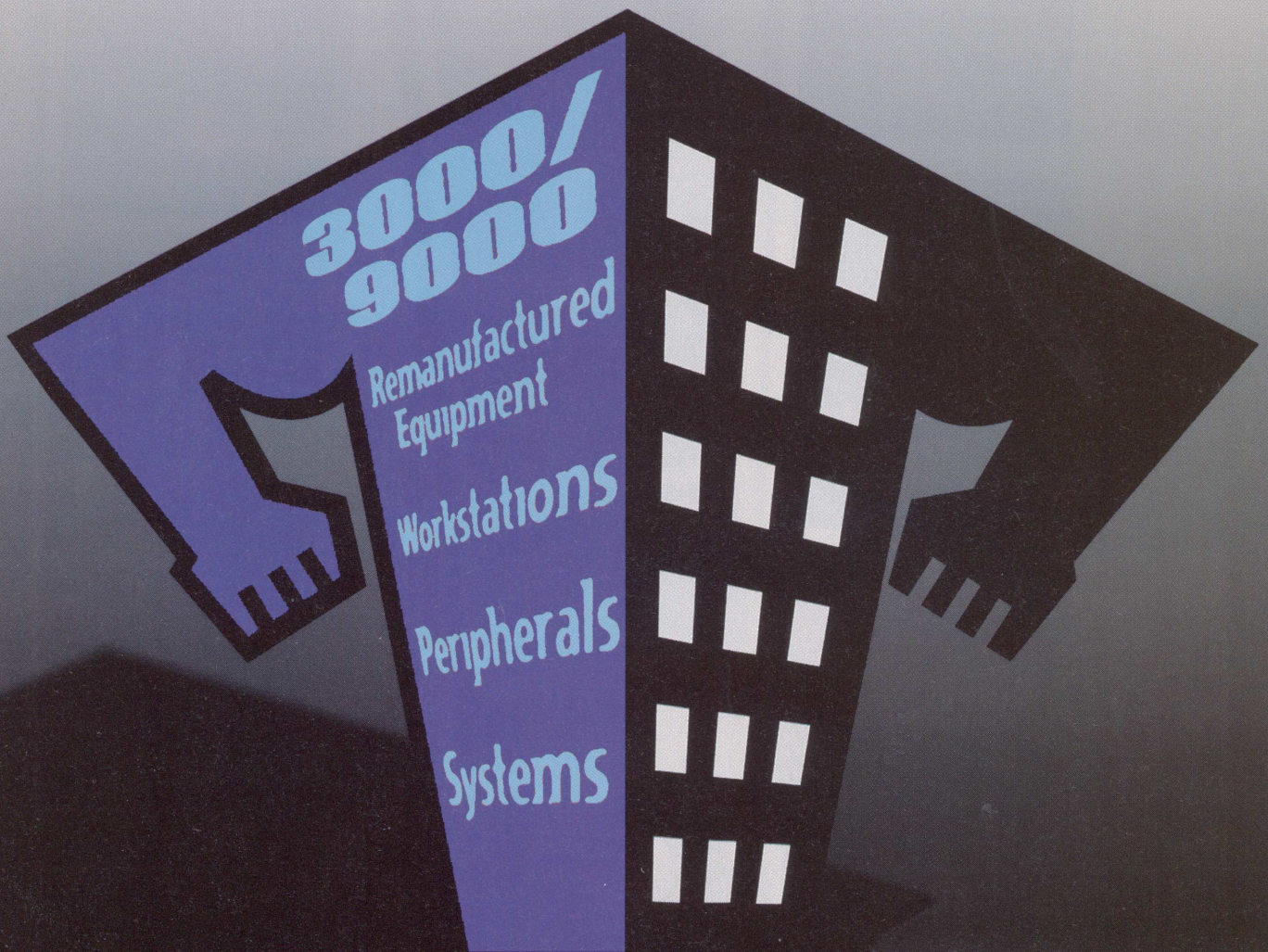
*Suzanne Reid is senior product manager at Stratus Computer, Inc. (Marlborough, Mass.).*

THE STRATUS SOFTWARE engineers maintained a clear division between the Stratus layers and the HP-UX operating system kernel, providing transparent Continuous Availability to HP OpenView. The benefits of this solution can be grouped in six major categories: transparency and simplicity — customers can plug a Stratus Continuum server into an HP OpenView environment with minimal effort; availability — there is no unplanned downtime; performance — the CA architecture eliminates performance degradation when applications must switch from server to server in the event of a failure; data integrity — "Lock-Stepped" processing ensures that processing will continue should key hardware components fail; affordability — hidden costs associated with script modification and additional support services can be eliminated, and the purchase of multiple third-party software licenses and system administration tools is not required; ease of implementation — CA systems do not require initial or ongoing planning, scripting or testing.

—S.R.



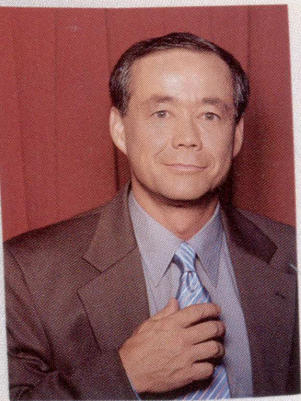
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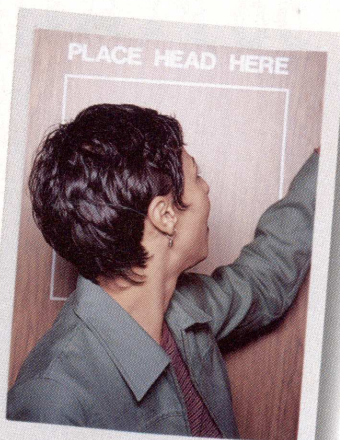
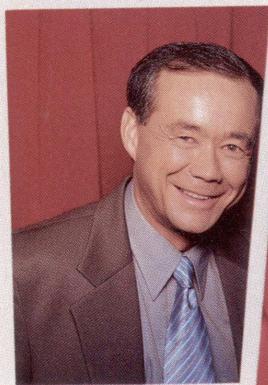
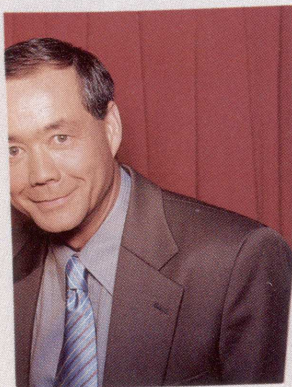
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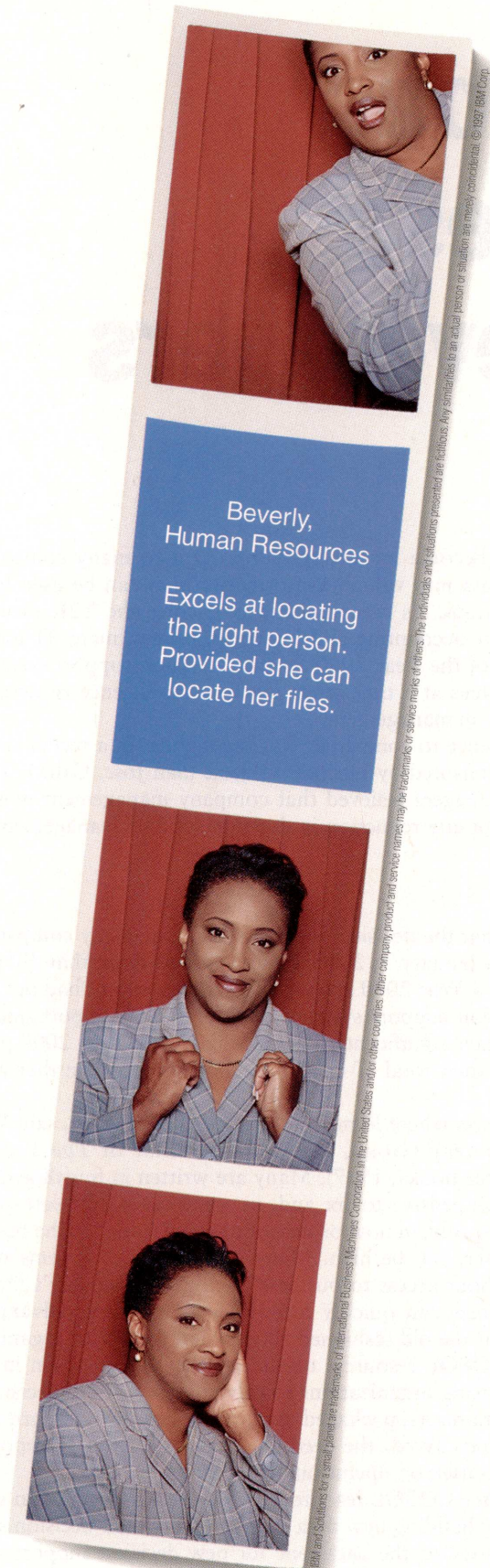
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# No Easy Decisions For Y2K Business Intelligence Developers

**D**ecision support systems have become increasingly important to many companies as they turn mountains of raw data into valuable information that can be used to make more intelligent business decisions. As companies race to solve the Y2K problem in COBOL-based operational systems like accounting and human resources, many IT managers are neglecting to consider the impact of the Year 2000 on their decision support systems. To make matters worse, this situation comes at a time when business intelligence is increasingly viewed as a critical resource by corporate management.

The importance of business intelligence to companies was highlighted in a recent survey of over 350 Fortune 1,000 companies sponsored by Business Objects (San Jose, Calif.). The survey showed that 63 percent of IT managers believed that company management would not tolerate or would be reluctant to accept any reduction in decision support management information.

## RISKING IMPACT

Unfortunately, the report concluded that the decision support systems at many companies are at risk of becoming non-functional on January 1, 2000. It showed that more than 97 percent of the companies surveyed had started a Year 2000 assessment, yet almost half had not started an assessment of the impact on decision support systems. In addition, the report uncovered that almost half of the organizations have significantly underestimated the Year 2000 problem as a whole and should spend more of their total IT budget on the problem than they are currently spending.

There are a multitude of Y2K projects where legacy reports are in bad shape, said William M. Ulrich, president of Tactical Strategy Group, Inc. and co-author of *The Year 2000 Software Crisis* (Prentice-Hall Computer Books, 1997). Many are written in fourth-generation languages that are old, difficult and expensive to fix and, in some cases, obsolete—leaving companies with two choices: to fix the problem now or do nothing and hope for the best.

The risks of doing nothing, however, can be high. Many of these older systems will not work in the next millennium and without access to business intelligence in today's fast moving, competitive marketplace, companies can quickly lose their competitive advantage by having to fall back on making decisions the old fashioned way, by gut feel. With organizations already stretching to find sufficient COBOL resources to address the Y2K problem in operational systems, Business Objects is advising organizations to solve the Year 2000 decision support problem in one of three ways: data marts, packaged application decision support, or production reporting. Each of these methods avoids the need to rewrite old COBOL reports and thus frees resources that can then be focused on operational systems problems.

**Data Marts:** Rather than investing scarce COBOL resources to rewrite old production reports, organizations can start from scratch by building new data marts to meet their decision support needs. These data marts can then be used as the backbone for new decision support systems where reports are re-implemented using modern tools.

**Packaged Application Decision Support:** Many organizations are applying the same philoso-

**YEAR  
2000**  
SPECIAL REPORT

*Dave Kellogg*



phy mentioned above to their operational systems and, rather than attempting to maintain them, are simply acquiring modern packaged applications from vendors like SAP and PeopleSoft. Most business intelligence vendors offer templates that can be used to accelerate the creation of new, decision support systems that provide access to the information used by these applications.

**Production Reporting:** Organizations with the least resources available to solve the Y2K problem for decision support systems can use production report servers to run reports against production databases during off hours and distribute those reports to users via mail systems, or by publishing them on the Web.

Implementing a new decision support solution is a smart way to address these issues, and has the added benefit of saving skilled COBOL programmers for correcting Y2K problems in the essential operational systems that run the business, commented Ulrich.

Clearly, decision support in most large organizations is in critical shape. But it's not too late for organizations to begin implementing one of these solutions, concluded Ken Orr, founder of The Ken Orr Institute, a business technology research organization concentrating on the Year 2000 issue. By replacing their critical COBOL reports with more modern decision support system products and using data warehousing technology, organizations can both solve a major component of their Y2K problems and create a far more dynamic information environment for end users that will take them well into the next millennium.

With the next millennium about a year and half away, now is the time to begin evaluating the effect of the Year 2000 on decision support systems. If you find your company can't live without business intelligence, one of the solutions outlined above should keep your decision support system working well into the next century.

*Dave Kellogg is vice president of corporate marketing for Business Objects (San Jose, Calif.).*

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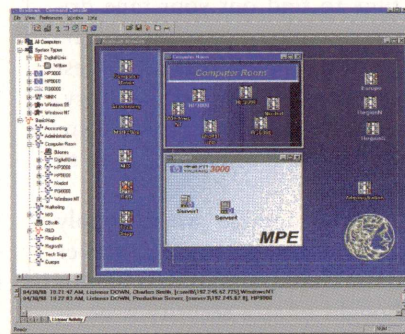


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# Ensuring Server SecureNT

**D**epending on your environment, you may want to make NT more secure. NT has received a C<sub>2</sub>

security rating from the National Computer Security Center, the highest rating given to off the shelf software.

## BASIC SECURITY

The three most important thing about security are backup, backup and backup. It's not enough just to make a backup, you need to test it. The worst time to find out your tape drives are not working properly is during the restore of critical data. To test your tape drive, backup a directory, restore it to a new directory and compare the results. It's the only way to be sure.

An un-interruptable power supply can prevent damage to your server and down time. While this is not often thought of as a security issue, it can be critical for continued operation of your system.

Your server is a valuable asset. If your system's case has a lock, use it. Don't leave they key taped to the case or forget to make sure that the server is connected to the rest of the network. Watch access to the network cables and hub. I've seen cases where a server stopped working because the network cables were switched, causing routing to fail.

NT server is most vulnerable before the operating system is running when it can't protect itself with restrictions. Floppy disk drives are on every machine and with bootable media such as CD ROM and ZIP dri-

ves, protecting the boot process is becoming more important. Usually boot sequences can be controlled in the BIOS. Check your BIOS to see if it's looking to floppies or other removable media before the hard drive.

Also, never install another OS on a critical machine. Most others do not feature the security of NT and can compromise critical files. If you must have multiple systems, consider changing the default time-out setting in boot.ini to zero. This will boot your default OS immediately and make it harder to select another system.

## DOS BOOT

Even though many people believe that having your boot partition formatted FAT will save time during a crash recovery, there is no way to protect the FAT system from anyone with a boot diskette. Therefore, NTFS is the only file system to use. It only takes sixty seconds to reboot from a DOS diskette and erase the system directory, crippling your server.

Also, make your boot partition NTFS during installation. The installation programs will set correct protections on all the system files. If you install your boot partition as FAT, then convert it later since protections on these very important files will not be set correctly.

NT can display a warning notice

before users login describing the dire consequences to those who use the system without proper authorization. This notice is useful for warning the unauthorized that they are liable for problems they cause.

## GROOMING YOUR REGISTRY

All the important configuration settings are in the registry which can be changed with the Registry Editors, REGEDIT and REGEDT32. You can prevent remote changes to the registry by defining the key HKEY\_LOCAL\_MACHINE\Current ControlSet\Control\SecurePipeServers\winreg.

The system page file is well protected while NT is running. If you are on a machine that boots multiple OSs, you may want to physically wipe the page file to prevent access from another OS.

Service Packs 2 and 3 allow you to enforce very strong passwords with a new DLL called *pasfilt* which requires that passwords become stronger by disallowing the use of the user name or any part of the full name, forcing them to be at least six characters long and include characters from at least three of four possible types — upper case letters, lower case letters, numerals and non-alphanumeric characters like punctuation.

There's more detail on securing your NT server in this month's column at [www.hppro.com](http://www.hppro.com). ♦

*Ryan Maley is a Microsoft Certified Systems Engineer and the information systems manager for a Midwestern manufacturing company.*



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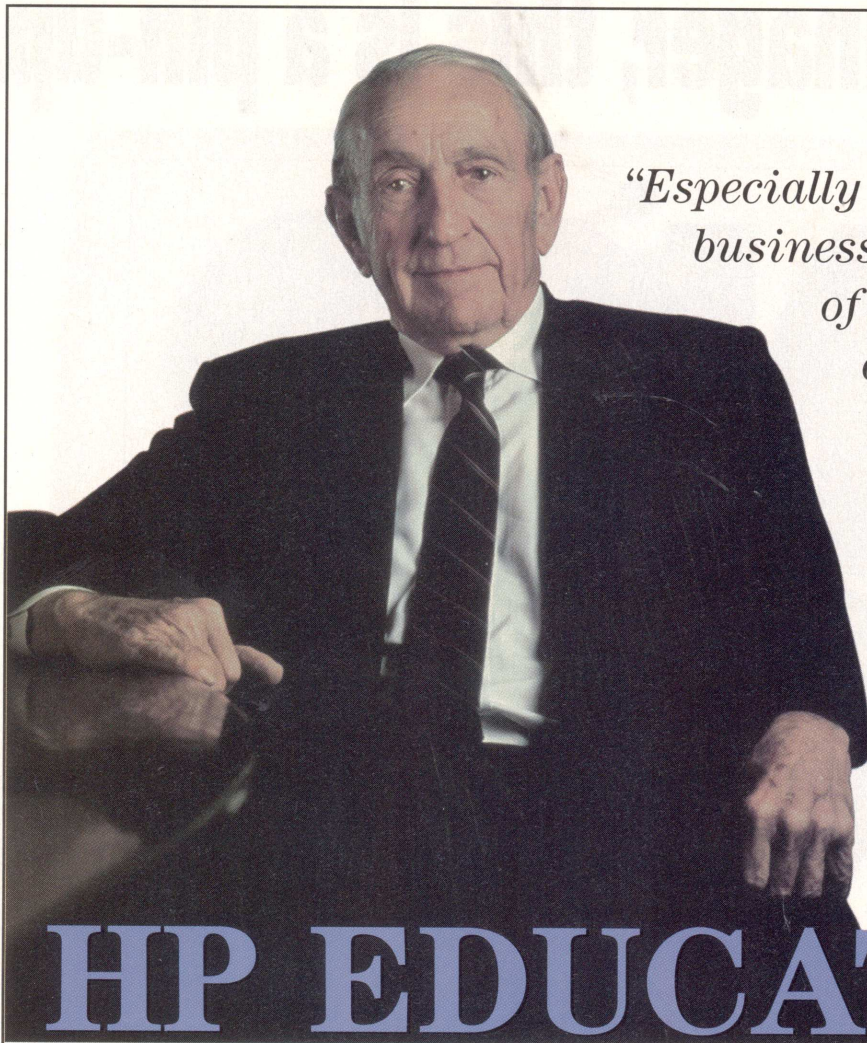


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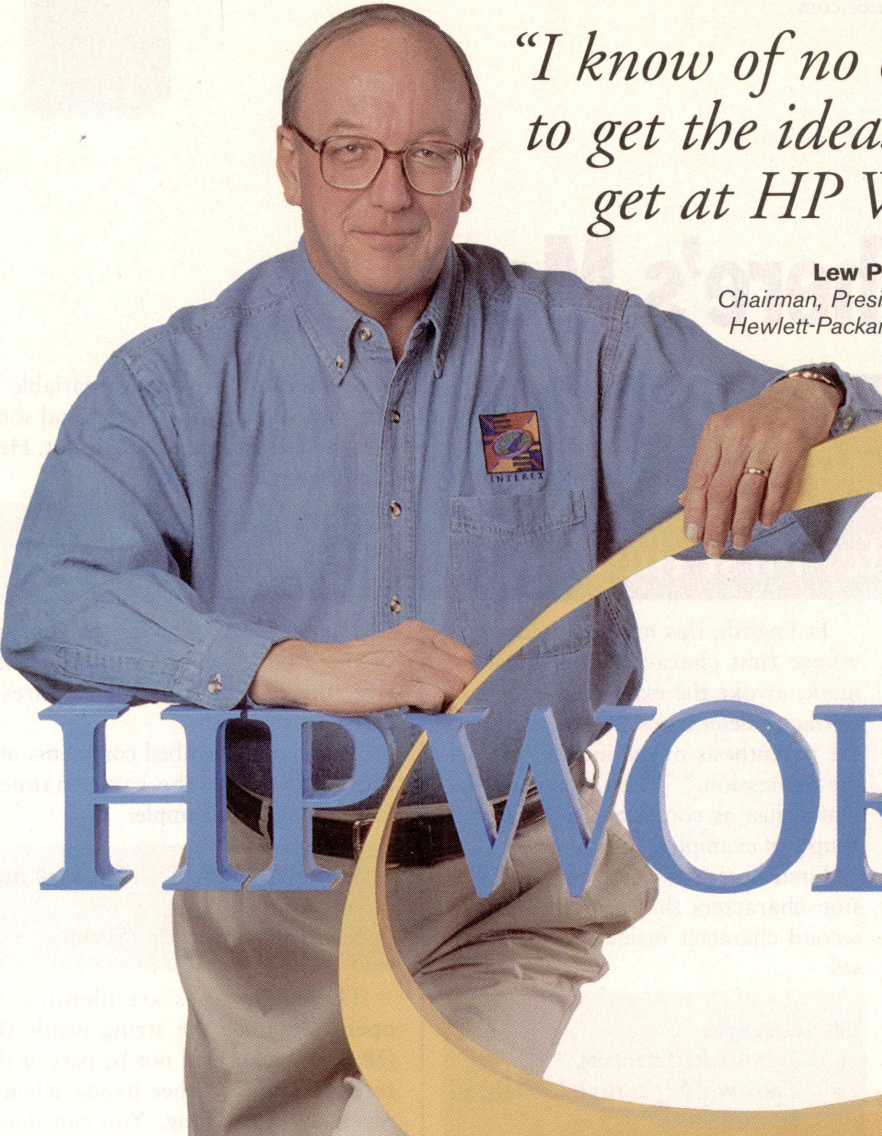
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# But Wait! There's More!

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a tomato, and ask what you'd pay for the knife. Next they'd start cutting wood, bricks, glass, metal and finally tell you the price. After that, they'd keep saying "but wait, there's more" and throw in all kinds of extra things for the same price.

Sometimes teaching a Perl programming class seems like one of those commercials — especially when talking about Regular Expressions (regex, for short). No matter how much time you spend on them, it seems like there is always more. This month's column, as an extension to the regex series we have been doing, will address some of Perl's regex extensions. I will assume you are familiar with Perl, and know how to use regexps in Perl.

## OVER EXTENDED

It is easy to overextend a financial budget, but with computers we often overextend a character set. Such is life with regexps. There are so many ways we might want to match text, yet we have to use text characters to invoke those meanings. This means that we have to either have many meanings for the same character depending on where it is used, or use multiple characters for a single meaning.

Perl designers mostly choose the latter route for their extensions. The common syntax for most extensions is:

```
(<extension-character> regexp-atom)
```

In English, this means "parenthesis whose first character is a question mark, invoke the extensions, the next character determines which extension, the parenthesis might include part of the expression." Then again, maybe that is just as confusing, so let's do a couple of examples.

First, here is a chart of the extension characters that are valid as the second character inside the parentheses:

```
# comment
: Non-backreferencing
= Zero width positive lookahead assertion
! Zero width negative lookahead assertion
<c> One of the match modifiers (ismx)
```

The simplest example would be to use the simplest extension. The difference between `/test/` and `/test/I` is that the second regexp uses the `I` match modifier. That means ignore case in the match, so it would also match `TeSt`.

We can turn the ignore case option on within a regexp using the extensions:

```
/(?i)test/;
```

This would be the same as using `/test/I`, so there is not much point in doing it this way. The real use is when

you are going to assign a variable to the data you are looking for, and some data is case sensitive, some is not. Here is an example:

```
$item="(?(i$name)); /$item/;
$item="$name"; /$item/;
```

The first line looks for the contents of the "name" variable case-insensitive, the second example requires a case-correct match.

You can also embed comments in a regexp in much the same manner. Continuing this example:

```
$item="(?(i$name); /$item(?# Item
is really $name)/;
$item="(?(i$name); /$item/;
```

These two lines are identical in operation since the string inside the `(?# )` extension will not be part of the regexp. This is rather handy when a regexp is really long. You can document each piece of the regexp separately.

## LONG AND WINDING REGEXPS

Long regexps can start to look like line noise due to all the funny characters squished together. Because of this, another useful feature for documenting or making a long regexp readable is the "extended" match modifier feature. This is invoked with either of these:

```
/test/x;
/(?x)exp/;
```

Like the `I` modifier, which method you use is determined by if you are assigning the regexp to a variable or not. The `x` modifier means make white space meaningless, so you can spread



out, or group sections of the expression for better readability. These two expressions are identical:

```
/test/;  
/t e s t/x;
```

In fact, the second one could be spread over multiple lines. Since all white space is ignored, you need to be careful if you actually want white space in the expression. If we wanted to match “E code,” the expression `/E code/x` would not work since the white space would be ignored. We need to encase the space character in a character class like this:

```
/E[ ]code/x.
```

Note that in an extended regexp, you can add comments just like in the rest of a Perl program. A `#` character means comment till end of line. Combining the extended and comment extensions we can write expressions that look like this:

```
/(?x)(?# put the x up front so you  
will know)  
# but then, this is a comment  
also  
\d+ # need one or more digits  
( # start a group  
\. # literal space character  
\d* # may be some more digits  
optional
```

## DON'T GO BACK!

The last example referred to above in non-extended form would be `/\d+(\.\d*)?/`. Basically, it means match 123 or 123.45. In Perl there is a way to use regexps to extract a match from a string. For example:

```
$_ = 'a 13 b 24';  
@x = /\d+/;  
print "@x";
```

The code above would print “13.” This is due to two things. First, we put the entire regexp in parentheses, but also it is because we caught the return in an array variable, thus requesting the match operations array context

operation, which means to return what was in parentheses. Note the results if we tried to use the regexp from above with the extra parentheses added:

```
$_ = '12.56 78';  
@x = /\d+(\.\d*)?/;  
print "@x";
```

The code above would print “12.56 .56.” Note that there were two numbers returned since there were two sets of parentheses. The second set, `(\.\d*)?`, was needed for grouping, but we did not want to have it returned (back referenced). We can fix this with the non-backreference extension character `:`. For example:

```
$_ = '12.56 78';  
@x = /\d+(?:\.\d*)?/;  
print "@x";
```

The code above would print “12.56” as desired.

As a side note, there is a global option, which would return all matches:

```
$_ = "a 23 b 19 c 3";  
@x = /\d+/g; # or /\d+/g  
print "@x";
```

The code above would print “23 19 3.” This would allow us to extract most of the floating point numbers from a string with this construct:

```
@x = /\d+(?:\.\d*)?/g;
```

I say “most of” since this is not a very good expression for the purpose, but illustrates the concept without creating so much line noise.

## SNEAKING A PEEK

Perl also allows you to “peek outside” of the expression to see if you have a match, but without actually matching what you are peeking at. Let’s suppose we wanted to figure out which items in some file were turned on. For example:

```
NIS=1 WIN95=0 XT=1
```

In the string above, we want to know that NIS and XT are turned on.

In English, we are looking for an item name, followed by “=1” not “=0.” If we used:

```
@on = /[A-Z]+=1/g;
```

The array `@on` would have elements of “NIS=1 XT=1.” This sort of works, but is not exactly what we wanted. (But wait, there’s more!!!).

In this case we can use positive assertion lookahead to say “only match a set of upper-case characters if it is followed by ‘=1’.” For example:

```
@on = /[A-Z]+(?=1)/g;
```

The array `@on` would now have elements of “NIS XT.”

Suppose we wanted to print the first name of people whose last name is not “simpson” from a file with one name per line like this:

```
bart simpson  
doug billion  
Ted Simpson
```

We could try a command like this:

```
perl -n -e 'print "$&\n" if  
/(\w+)(?!=s+simpson\b)/i;'
```

which would result in:

```
doug
```

Pretty exciting, huh? Using the `(?! )` extension means that the enclosed must NOT come after what we are looking for. For example:

```
/test(?!$)/
```

would only match “test” when it was not at the end of the string (`$` means end of string when it is at the end of the regexp).

So, now that you have seen all this stuff that Perl can do with regexps, how much would you pay for it? Our price is only \$0 plus \$0 shipping, in three easy payments. (Then again, you can download it free from [www.perl.org](http://www.perl.org) or [www.perl.com](http://www.perl.com).)

*Fred was last seen preening in front of a mirror for a job as an infomercial spokesmodel.*



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### 4Thought Extends Cognos' Business Solution

4Thought 4.0 delivers enhanced automated analysis and modeling capabilities and integration with Cognos' Impromptu, PowerPlay, and Scenario software.

4Thought's new capabilities include a spreadsheet interface, multiple worksheets on a table or multiple tables within a project, workspace window to manage projects, models, and forecasts, graphical views, dynamic and interactive model building, fitting algorithms for accurate models, overfitting protection for better predictability and Wizards for reading and deployment of analysis results. It is priced

at \$20,000.

►Contact Cognos Corp., Burlington, MA at (800) 426-4667.

## DESKTOPS AND SERVERS

### Hitachi's VisionBook Pro 6000

The VisionBook Pro 6000 notebook includes Intel's 266 MHz Mobile Pentium Processor with MMX technology, 32MB RAM (expandable to 128MB) and a 12.1 inch TFT display. It offers either an integrated 10/100BaseT LAN interface or 56Kbps modem. Storage includes a 3.2 HDD, 24X CD-ROM and 1.44MB floppy. An optional Zip drive is available.

Additional features include two Type II or one Type III PC card slot, IrDA 1.1 infrared and a USB port. It comes preloaded with Windows 95, is Windows 98 compatible and NT support is also available. Expected street price is \$2,599.

►Contact Hitachi PC Corp., Milpitas, CA at (408) 546-8000.

## DISASTER RECOVERY AND SECURITY

### Multima Releases NetKeeper Internet

NetKeeper Internet is a Web based self-service help desk solution to add to NetKeeper Help Desk software programs. By installing NetKeeper Internet with NetKeeper Help Desk software, the help desk staff can give customers and employees access to the "self service" features of NetKeeper Help Desk program. NetKeeper has end-user entry and tracking of service calls, auto escalation of the calls, queue assignment of work orders and access to the SolutionsKeeper knowledge-

base, for quick problem resolution. The browser will automatically download a small Java applet upon login to NetKeeper Internet. It is priced at \$3,200 per server for unlimited users.

►Contact Multima Corporation, East Greenwich, RI at (800)532-4862.

## E-COMMERCE

### Digital Foundry's DASH 1.2

DASH 1.2 is the newest version of an automated web hosting solution for the NT and IIS platforms. With improved administrative capabilities, flexibility and standards support, DASH 1.2 makes it easier for ISPs and large enterprises to roll out NT web hosting services. DASH 1.2 adds the following: enhanced administration capabilities, host headers to conserve limited supply of IP Addresses, dynamic DNS to add DNS entries to their DNS Server when the user's web site is provisioned and HTTP Post support to provision web sites without being required to create FTP accounts for their users.

►Contact The Digital Foundry, Tiburon, CA at (415)789-1600.

## MESSAGING AND E-MAIL

### Dispatch For MCI Mail Adds Internet Option

Common Sense Solutions has released Dispatch v3.1, its MCI Mail client program for Windows 95/NT which can now send Internet mail directly via SMTP server (either networked or dial-up) to minimize message charges.

If a message is addressed to both Internet and MCI Mail recipients, Dispatch 3.1 will split the address list and send a copy each way. Replies to Dispatch 3.1 Internet messages go to the sender's MCI Mail account. A free plug-in module is also available to monitor and download messages from any POP3 account into Dispatch 3.1. It is available for \$59.95.

►Contact Common Sense Solutions, New Windsor, IL at (309) 667-2772.

## NETWORK INTEGRATION

### FacetCorp Releases FacetWin 2

FacetCorp has released FacetWin Version 2, which includes a complete graphical administration utility, PC clock synchronization with UNIX, and enhanced NT domain compatibility. The FacetWin administrator provides a Windows 95/NT property sheet interface, allowing administrators to control all aspects of the FacetWin environment from a single point.



*Ever wish you could take your workstation with you? Ever thought how much more productive you'd be if you could pack all the performance in your UNIX workstation into a laptop? You'd be free to work at your desk, at home or in the field. You'd be more versatile. More mobile. More effective.*



## It's a new way of working

### The time has come.

RDI Computer Corporation has designed the first notebooks equivalent to a Sun desktop workstation and a Hewlett-Packard mid-range system. They combine full desktop performance with portability, so you can be more productive whenever and wherever you work.

### An UltraSPARC notebook

RDI's UltraBook™ is the notebook equivalent of Sun's UltraSPARC® midrange desktop.

There's true desktop power from a 200 MHz or 167 MHz UltraSPARC processor. It uses the same chip set Sun uses and packs full compatibility with Sun Solaris® into a lightweight, compact system.

### An HP-UX notebook

PrecisionBook™ is the first portable workstation based on Hewlett-Packard's PA-RISC™ processor architecture. It's the notebook equivalent of HP's VISUALIZE™ B-Class (mid-level) workstation.

PrecisionBook utilizes HP's PA-7300LC™ processor and ensures 100% compatibility with HP-UX 10.20 for full desktop performance and capability.

### True desktop performance

UltraBook and PrecisionBook can be effective for applications that don't traditionally demand portability. They offer expansion to configurations even surpassing standard desktops. Such as three removable disk drives and up to 512 MB of field installable memory. A 14.1-inch active matrix LCD provides equivalent usability to a 17-inch CRT monitor.

Now you have a brand new way of working. Use your RDI notebook workstation on the desktop as your primary system for software development, engineering, modeling or dbase. Both systems feature high-end graphics for creating and manipulating complex 2D and 3D images, ideal for CAE/CAD/CAM, ECAD and MCAD.

### Business-critical computing

Troubleshooting your network, field data acquisition and off-site training is easier since you can work anywhere, anytime.

- Perform systems administration, networking, database and customer service applications wherever needed.
- Set up client/server environments at field locations, since an RDI notebook can remotely emulate a UNIX server.
- Use it as a shared resource within a department or for telecommuting.

### Software demonstration

UltraBook or PrecisionBook will change the way you work. Swapping your RDI notebook for a desktop makes trade show demonstrations and presentations at client sites so much easier.

You won't have to deal with shipping costs, lost freight, and hassles with rentals and customs. You won't have to rely on your customer to have their system set up for you. You won't have to go in extra early to do on-site configurations.

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## new products

FacetWin provides Windows 95/NT to UNIX integration, including file & print services, terminal emulation, PC backup/restore, POP3 e-mail server, modem server and remote computing support. FacetWin Version 2 is priced at \$195 with discounts for multi-user licenses.

►Contact FacetCorp, Plano, TX at (800) 235-9901.

## SERVICES AND SUPPORT

### ATL And FedEx Combine On Spare Parts Depot Service

ATL Products and FedEx have teamed on a spare parts warehousing program that will let ATL use FedEx's service and nationwide distribution centers to provide predictably fast parts delivery.

The program uses the shipper's Express Distribution Depot (EDD) service, a 50-city network of parts warehouses nationwide. EDD centers will be stocked with ATL parts and available to their customers 24x7x365. ATL's customer service department will verify the need for a part and dispatch the request to FedEx who will make arrangements to pick up the part from the depot closest to the customer and ship it directly.

►Contact ATL Products, Irvine, CA at (800) 677-6268.

## STORAGE

### ATL's New PL50 Library Hub

ATL Products, Inc. has announced the immediate availability of the PL50 Library Hub which lets system administrators connect up to three UNIX or NT back-up servers running any data management software to a single ATL Library. The benefits of the PL50 include library resource sharing, higher performance versus conventional network back-up, and compatibility with popular back-up software.

The PL50 Library Hub presents a virtual library partition to each back-up server for use as its own dedicated library. With the announcement of the PL50 Library Hub, a single library can be shared by multiple back-up servers, each having an abundance of disk.

►Contact ATL Products, Irvine, CA at (800) 677-6268.

### ATL's P3000 DLT Library

The P3000 is the industry's first library with a High Availability (HA) design. It features up to 16 DLT drives and 332 cartridges for 288 gigabytes per hour performance and 11.6 terabytes of storage capacity.

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## new products

The HA design features single connector hot-swap DLT drives, power supplies and fans as well as redundant power supplies, fans and AC sources. It also features IntelliGrip, ATL's cartridge handling system which is maximized to ensure reliable DLT operation within the library environment. Remote management is achieved through WebAdmin with a Java-enabled browser.

►Contact ATL Products, Irvine, CA at (800) 677-6268.

### Procom's New NetFORCE 1000

NetFORCE 1000 is designed to store 90 gigabytes to 900 gigabytes in multi-protocol environments. NetFORCE, equipped with a 64-bit operating system, acts as a data pump when clients request information. Since NetFORCE is handling data requests, file server performance is improved for application and administrative tasks. Based on in-house LADDIS tests, NetFORCE delivers up to 2,700 i/ops and access times as low as 1.2 miliseconds.

NetFORCE incorporates Procom's Reliant 1000 RAID systems which are available with an Ultra-Wide SCSI interface and can be upgraded to a Fibre

Channel interface. Transfer rates using these interfaces are 40MB/sec using an Ultra-Wide SCSI connection and 100MB/sec using a Fibre Channel connection. Prices range from \$73,275 for 90GB to \$278,405 for 50-drive 900GB system.

►Contact Procom Technology, Irvine, CA at (800) 800-8600

## YEAR 2000

### NeoMedia's ADAPT-PC/2000

ADAPT-PC/2000 searches databases, spreadsheets and other file types, identifying any data that appears to contain data not Year 2000 compliant, which is defined by a set of user-defined search criteria.

It works on common PC databases and spreadsheets that include Microsoft Access v2-97; dBase III and IV; Paradox 2.x and 4.x; FoxPro 2.0, 2.5, 2.6; Lotus 123; Quattro Pro; and Symphony. ADAPT-PC/2000 provides comprehensive auditing of the conversion process and ongoing protection against non-compliant EDI or other data strings that contain dates - even after the millennium.

►Contact NeoMedia Technologies, Cincinnati, OH at (513) 984-1822. ♦



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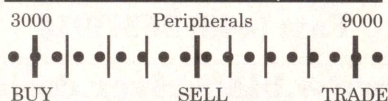
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# Expand Your Virtual Horizons

Any good Web page needs good graphics. Most Web developers are presented with the classic build or buy dilemma — do I invest the time, turmoil and trouble in creating my own images, or do I spend a reasonable amount of cash buying ready-to-use icons?

Forget reasonable — how does free sound?

This month we look for Web sites that specialize in free, downloadable icons, animations and images that can make any home-grown Web page sizzle.

If you have the artistic aspirations of R. Crumb or Peter Max but the talent of Maxwell Smart or Aunt Beulah's Apple Crumb Cake, maybe these sites can help.

Get to them all through [www.hppro.com](http://www.hppro.com).

—Ken Deats

START WITH THE ICON Arcade, the site that was “created as a service to people in the development of Web pages, icon collectors and those wishing to personalize their computers.” They offer the *Icon Information* pages which contain info on the best applications for creating, maintaining collections, and customizing applications.



CHECK OUT THE ICON ARCADE FOR IMAGES AND HELPFUL TIPS AT [MEMBERS.XOOM.COM/WEBWORM/INDEX.HTML](http://MEMBERS.XOOM.COM/WEBWORM/INDEX.HTML).

“WELCOME TO The Free Site, home of the Web’s best freebies.” Self promotion aside, this is a very good site for icon collecting. You’ll find a menu that includes Banner Freebies, Chat Freebies, Free Counters, Digital Postcards, E-mail Freebies, Freebies FAQ, Fonts, Forms and Games plus many more. There’s also Free Graphics, Free Guestbooks, Java and Miscellaneous Freebies.



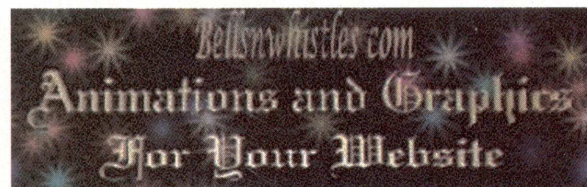
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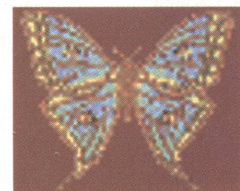
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EXACTLY WHAT their URL implies, Bellsnwhistles has a bit of everything. The site brings you absolutely free Web site graphics, javascripts, resources, hard to find HTML, and many other useful things. And, they claim to play music for you while you browse.



BELLS AND WHISTLES IMPLIES ALL THE EXTRAS YOU MIGHT WANT BUT NOT NECESSARILY NEED FOR YOUR SITE. FIND THEM AT [WWW.BELLSNWHISTLES.COM](http://WWW.BELLSNWHISTLES.COM).

LAST BUT DEFINITELY not least, stop by the Free Clip Art Directory. As they say on their home page, “Clip art graphics add color and interest to a Web site. Fortunately there are lots of sites that offer free graphics for Web site builders. Unfortunately there is so much clip art available that it’s hard to figure out where to start.” This is a good place.



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## HP 3000 Resource Guide

From Abtech Systems

to Zitel Corporation,

Accounting to

Year 2000 —

link to them through

[www.hppro.com](http://www.hppro.com).



Company Name	Location	Phone	Product Name
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**Accounting Tools**

Advacate, Inc.	Indianapolis, IN	(317) 577-8729	WinMan
Amisys Managed Care Systems, Inc.	Rockville, MD	(301) 251-8600	AMISYS
BeneSys, Inc.	Westlake Village, CA	(805) 494-1075	Group Health Administration
BI-TECH Software, Inc.	Chico, CA	(916) 891-5281	Interactive Fund Accounting System
Celerity Solutions, Inc.	Concord, MA	(978) 287-5888	Continuum
CFS, Inc.	Bellevue, WA	(425) 453-4776	CFS/Manufacturing System
Chris Schaefer & Company	Houston, TX	(281) 578-9955	PILOT Financial Accounting Systems PILOT Property Management
Computer Associates/MK Group	Islandia, NY	(516) 342-5224	ManMan/HP
Distribution Resources Company	Englewood, CO	(303) 889-4500	SFD/System For Distributors Invision for SFD
Idaho Computer Service, Inc.	Twin Falls, ID	(208) 734-2245	Accounting Software Modules
Jobscope Corporation	Greenville, SC	(800) 443-5794	Jobscope
LeeTech Software, Inc.	Cupertino, CA	(408) 253-1987	LeeTechCare TEAMS Training/Education Asset Mgmt.
Mitchell Humphrey & Co.	St. Louis, MO	(800) 237-0028	FMS II Accounting
Multiview Corporation	Peabody, MA	(508) 535-4400	Financial Applications
Orion Group Software Engineers, Inc.	Indianapolis, IN	(800) 59-ORION	Continuum•Prophecy
Q-Cim, Inc.	Monmouth Junction, NJ	(732) 398-0100	Process manufacturing software
SOTAS International, Inc.	Haverhill, MA	(508) 372-0770	Accountable Solutions/CS
Telenomics, Inc.	Canyon Lake, CA	(800) 328-1177	PWARE/3000

**Application Development Tools**

API International	Austin, TX	(512) 280-4391	Faces
Acucobol, Inc.	San Diego, CA	(619) 689-7220	Acucobol-GT
Aldon Computer Group	Oakland, CA	(510) 839-3535	Analyzer•Harmonizer
Bradmark Technologies, Inc.	Houston, TX	(800) 621-2808	PERCobol•Starvision•Starman•Supervex
Computing Solutions Ltd.	Worcestershire, U.K.	+44-1905-794400	Linkway
Corporate Computer Systems, Inc.	Holmdel, NJ	(732) 739-5600	TRAX/Cobol+C
DB-Net, Inc.	Columbus, OH	(614) 436-6565	DB-NET Migrations
DevTech Associates	Naperville, IL	(630) 355-4404	Open3000
Dynamic Information Systems Corp.	Boulder, CO	(303) 444-4000	Omindex
LeeTech Software, Inc.	Cupertino, CA	(408) 253-1987	AIM - App. Intelligent Middleware
Lund Performance Solutions	Albany, OR	(541) 926-3800	Developer's Toolbox
MiniSoft, Inc.	Snohomish, WA	(360) 568-6602	ODBC/32•Middleman
Productive Software Systems, Inc.	Minneapolis, MN	(800) 726-4099	Robot/3000
Protos Software Company	Georgetown, TX	(800) 531-5473	Protos App. Development System
PSG	Reston, VA	(703) 471-0076	Facade
Speedware USA	San Ramon, CA	(510) 867-3300	OASIS•Visual Speedware

**Backup/Recovery Tools**

Hicomp America, Inc.	Spring, TX	(800) 323-8863	Hiback TX
Legato Systems, Inc.	Palo Alto, CA	(415) 812-6000	NetWorker
Operations Control Systems, Inc.	Palo Alto, CA	(415) 493-4122	Tape
ORBIT Software USA, Inc.	Danville, CA	(800) 89ORBIT	Backup/V•Backup/3000
Unison Software	Santa Clara, CA	(408) 988-2800	RoadRunner•Tapes Plus
IEM, Inc.	Fort Collins, CO	(800) 321-4671	IEMACL

**Bar Coding**

BKS Electronique	Le Pont De Claix, FR.	+33 4 76 98 57	Wedge Reader
Dennis and Schwab, Inc.	Tustin, CA	(714) 505-1270	Barcode Tool Kit



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<b>Batch Job Management</b>			
Design 3000 Plus, Inc.	Salem, OR	(503) 585-0512	Job Management System/3000
Nobix, Inc.	Pleasanton, CA	(510) 227-5600	JobRescue 3000 • JobTime 3000
Operations Control Systems, Inc.	Palo Alto, CA	(415) 493-4122	Express
Unison Software	Santa Clara, CA	(408) 988-2800	Maestro
<b>Data Communications</b>			
Extended Systems, Inc.	Boise, ID	(800) 235-7576	Status/3000
TAG Business Computing	Kenilworth, U.K.	+44-1926-864868	TAGpager
Telamon	Oakland, CA	(510) 987-7700	Synchronous Network Engine Asynchronous Network Engine
<b>Consulting/Integration</b>			
Chris Schaefer & Company	Houston, TX	(281) 578-9955	Internet, consolidation and migration services
Computer Solutions, Inc.	Orange, NJ	(973) 672-6000	Disaster recovery/outsourcing services
Dataflow Systems, Inc.	Indianapolis, IN	(317) 781-1111	Legacy application/client server/ integration support
Delaware Computing Services	Wilmington, DE	(302) 996-0490	MPE/iX international industrial solutions consulting
Forsythe Solutions Group, Inc.	Skokie, IL	(847) 675-8090	HP 3000 servers and consulting services
Gentry	Oakland, CA	(800) 998-9902	HP 3000 systems consulting
ID Enterprises, Inc.	Roswell, GA	(770) 587-5223	Software developers
NetSysCo	Louisville, KY	(800) 888-9028	HP nationwide recruiters
SW Consulting, Inc.	North Ft. Myers, FL	(800) 494-4977	MPE programming, consulting, training
<b>Data Center/Help Desk/Change Management</b>			
API International	Austin, TX	(512) 280-4391	Vantage
Design 3000 Plus, Inc.	Salem, OR	(503) 585-0512	Callback/3000
Diamond Optimum Systems, Inc.	Woodland Hills, CA	(800) DOC-VCS-1	VCS
GBS Consultants, Inc.	Elmsford, NJ	(800) 322-7007	Tracker
Operations Control Systems, Inc.	Palo Alto, CA	(415) 493-4122	Librarian•Chargeback
Unison Software	Santa Clara, CA	(408) 988-2800	DCM Pak
<b>Database Tools/Utilities</b>			
Adager Corporation	Sun Valley, ID	(208) 726-9100	Adager Adapter/Manager
Bradmark Technologies, Inc.	Houston, TX	(800) 621-2808	DBGeneral•DBAudit
Cognos, Inc.	Ottawa, ONT, CAN.	(613) 738-1440	Axiant 4GL•Powerhouse 4GL
Datastructure, Inc.	San Francisco, CA	(415) 495-7484	DB/Access
Information Builders, Inc.	New York, NY	(800) 969-INFO	EDA/SQL•FOCUS
Informix Software	Menlo Park, CA	(415) 926-6300	Enterprise Gateway Manager
LeeTech Software, Inc.	Cupertino, CA	(408) 253-1987	DB/Advisor•DOOR - Data Object Open Replication
M.B. Foster Associates Ltd.	Chesterville, ONT, CAN.	(613) 448-2333	DataExpress
Quest Software	Newport Beach, CA	(949) 720-1434	BridgeWare
Robelle Consulting Ltd.	Surrey, BC, CAN.	(888) ROBELLE	Suprtool
Taurus Software	Palo Alto, CA	(415) 961-1323	Warehouse•BridgeWare
Vital Soft, Inc.	Sunnyvale, CA	(800) 848-2576	BusinessObjects•BrioQuery
3k Associates, Inc.	Springfield, VA	(800) NETMAIL	DeskLink
<b>Document Management</b>			
Unison Software	Santa Clara, CA	(408) 988-2800	Formation
<b>E-Mail</b>			
3k Associates, Inc.	Springfield, VA	(800) NETMAIL	NetMail/3000•POPServer/3000



Company Name	Location	Phone	Product Name
Genesee Software, Inc.	Englewood, CO	(800) 728-9123	Posthaste•Mailmessenger Mailempower•Monarch
<b>EDI</b>			
M.B. Foster Associates Ltd.	Chesterville, ONT, CAN.	(613) 448-2333	EDI Windows
Trinary Systems, Inc.	Farmington Hills, MI	(810) 442-8540	EDI Windows
<b>Editors</b>			
Inclination Software, Inc.	Incline Village, NV	(702) 831-5595	SpeedEdit•SpeedDoc
<b>Emulation</b>			
Attachmate Corporation	Bellevue, WA	(800) 933-6751	KEA! 700/98
WRQ, Inc.	Seattle, WA	(800) 872-2829	Reflection Suite for HP Reflection with NS/VT
<b>Fax Automation</b>			
STR Software Company	Richmond, VA	(804) 897-1600	FAX/3000

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Millennium Rx includes bridging interfaces which allow converted and unconverted programs to simultaneously access the same image data regardless of how year values are stored internally. This provides users with the ability to begin system testing of converted programs while unconverted programs continue to run against the same data. This also allows for conversion of only specific programs while avoiding the potentially high cost of converting every program in the system.





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### **Purchase Req./Purchase Orders**

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### **Shop Order Release and Control**

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### **Shop Floor Control**

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### **Job and Project Management**

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- Adager supports the latest HP technologies for IMAGE, such as Dynamic Dataset Expansion (DDX), Jumbo datasets (datasets greater than 4 gigabytes), and Third-Party Indexing (TPI) and Hewlett-Packard's B-trees.
- Adager transforms your IMAGE/SQL databases without having to manually detach them from their SQL DBEs and subsequently reattach them.
- Adager works together with Netbase and Shareplex to automatically replicate any and all kinds of Adager transformations on the shadow system.
- Adager helps you with your Year 2000 projects. Adager's "Examine Date" function validates your date information under a variety of formats. Adager's "Change Date" function converts legacy dates (which are typically limited to 1999 or just a few years after) into formats that support up to 9999 (or even beyond, if you wish).



Company Name	Location	Phone	Product Name
TAG Business Computing	Kenilworth, U.K.	+44-1926-864868	TAGfax
<b>Hardware/Resellers/Maintenance</b>			
Abtech Systems, Inc.	Carlsbad, CA	(800) 474-7397	HP 3000 servers
Allon Computer	Norwalk, CT	(203) 854-9446	Refurbished servers
Black River Computers	North Ridgeville, OH	(800) 837-0061	HP 3000 maintenance
Client Systems LLC	Denver, CO	(303) 337-7300	HP 3000 servers
Computech Systems Corp.	Kirkland, WA	(800) 882-0201	HP 3000 servers
ConAm Corporation	Inglewood, CA	(800) 926-6264	HP 3000 servers
CSU Industries, Inc.	Cedarhurst, NY	(516) 239-4310	HP 3000 servers
Eurodata, Inc.	Ottawa, ON, CAN.	(613) 745-0921	HP 3000 servers
Gates/Arrow Distributing	Greenville, SC	(864) 627-2495	HP 3000 servers
Genisys Corporation	Redmond, WA	(425) 869-6055	HP 3000 remarketer
Hardwarehouse	Dallas, TX	(214) 754-4700	HP 3000 remarketer
I/O Data Systems, Inc.	Bay Village, OH	(216) 835-2211	HP 3000 servers
Ideal Computer Services, Inc.	Livermore, CA	(800) 862-8787	HP 3000 servers
Kelly Computer Systems	Mountain View, CA	(415) 960-1010	HP 3000 servers
NCSI	Akron, OH	(800) 897-9351	HP 3000 servers
Norco Computer Systems, Inc.	Strongsville, OH	(800) 892-1920	HP 3000 servers
Open-Ended Systems Corporation	Carson, CA	(800) 876-5975	HP 3000 servers
Sirius	San Antonio, TX	(800) 460-1237	HP 3000 servers
Surety Systems, Inc.	Houston, TX	(713) 466-9455	HP 3000 servers
Triad Computer Connection, Inc.	Woodinville, WA	(425) 402-1700	HP 3000 servers
Wellington Technologies, Inc.	Strongsville, OH	(216) 238-4377	HP 3000 maintenance

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Fixed Assets, Budgeting, Encumbrance Accounting, Project Accounting, Consolidations, Workflow and Decision Support.

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Company Name	Location	Phone	Product Name
<b>Human Resources</b>			
Cort Directions, Inc.	Bend, OR	(800) 618-3880	Cort Payroll and Human Resources
Cyborg Systems, Inc.	Chicago, IL	(312) 454-1865	Solution Series/ST
High Line Corporation	Markham, ONT, CAN.	(800) 268-3340	Personality4GL
Ross Systems, Inc.	Atlanta, GA	(770) 351-9600	Renaissance CS Financials
<b>Internet Tools</b>			
MiniSoft, Inc.	Snohomish, WA	(360) 568-6602	Javelin • Frontman
Speedware USA	San Ramon, CA	(510) 867-3300	Autobahn
<b>Memory</b>			
Camintonn/Z-RAM	Irvine, CA	(800) 368-4726	HP 3000 memory
Clearpoint Enterprises	Milford, MA	(800) 253-2778	HP 3000 memory
Dataram Corporation	Princeton, NJ	(800) DATARAM	HP 3000 memory
Kingston Technology Company	Fountain Valley, CA	(714) 435-2600	HP 3000 memory
Lynne Company	Arroyo Grande, CA	(805) 489-1564	HP 3000 memory
Workstation Direct LLC	Greenwich, CT	(800) 406-6474	HP 3000 memory
<b>Networking Utilities</b>			
API International	Austin, TX	(512) 280-4391	Fastcopy
MiniSoft, Inc.	Snohomish, WA	(360) 568-6602	Network File Transfer
<b>Performance/Management Tools</b>			
Bering Technology, Inc.	Campbell, CA	(408) 364-6500	RAIDRUNNER
Bradmark Technologies, Inc.	Houston, TX	(800) 621-2808	MPE Command Center•DSMCheck
Diamond Optimum Systems, Inc.	Woodland Hills, CA	(800) DOC-VCS-1	Stargate

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Company Name	Location	Phone	Product Name
Infoworld Enterprise Solutions	Concord, OH	(216) 357-9200	MPE Enterprise Management
Lund Performance Solutions	Albany, OR	(541) 926-3800	SOS/3000•Performance Gallery Forecast/3000•De-Frag/X Q-Xcelerator•System Manager's Toolbox
Melillo Consulting, Inc.	Somerset, NJ	(732) 563-8400	MPE System Administration
SolutionSoft Systems, Inc.	Santa Clara, CA	(888) 884-7337	Compression Storage Manager for MPE Disk Space Manager for MPE
Zitel Corporation	Fremont, CA	(800) 622-5020	Netarchitect•Vam/Capacity Planner
<b>Reporting Tools</b>			
Chestnut Data Systems	Cherry Hill, NJ	(800) 871-8115	CDS/Scan
Hillary Software, Inc.	Spring Lake, NJ	(732) 974-8484	Sheetmate
Interactive Software Systems, Inc.	Denver, CO	(303) 987-1001	Safari UDMS
Nobix, Inc.	Pleasanton, CA	(510) 227-5600	Electropage 3000
O'PIN Systems	Bloomington, MN	(800) 888-1804	Reveal
Unison Software	Santa Clara, CA	(408) 988-2800	Vista Plus
Vital Soft, Inc.	Sunnyvale, CA	(800) 848-2576	Visimage•ASKPLUS
<b>Security Software</b>			
Chestnut Data Systems	Cherry Hill, NJ	(800) 871-8115	CDS/Security
Hillary Software, Inc.	Spring Lake, NJ	(732) 974-8484	Nightwatch
Monterey Software Group, Inc.	Cupertino, CA	(408) 253-1778	SAFE/3000
Operations Control Systems, Inc.	Palo Alto, CA	(415) 493-4122	Private
O'PIN Systems	Bloomington, MN	(800) 888-1804	Pinpoint
Vesoft, Inc.	Los Angeles, CA	(310) 282-0420	Security/3000•Veaudit/3000
<b>Print Spooling Tools</b>			
API International	Austin, TX	(512) 280-4391	Unispool
APPiC	Sunnyvale, CA	(800) 872-7742	StarJet
MiniSoft, Inc.	Snohomish, WA	(360) 568-6602	NetPrint•Flexform
Nobix, Inc.	Pleasanton, CA	(510) 227-5600	TranSpool 3000•Transpooler
RAC Consulting	Olympia, WA	(360) 357-9572	Espul•Printpath
Unison Software	Santa Clara, CA	(408) 988-2800	SpoolMate
<b>Year 2000</b>			
ConSyGen, Inc.	Phoenix, AZ	(602) 496-4545	ConSyGen 2000
Diamond Optimum Systems, Inc.	Woodland Hills, CA	(800) DOC-VCS-1	Doc/3000
G.R. Helm, Inc.	El Dorado Hills, CA	(916) 933-9669	TimeShift 2000
NeoMedia Technologies	Cincinnati, OH	(888) YR2K ALS	Adapt/2000
Omni Solutions Inc.	Studio City, CA	(800) 935-0101	TimeWarp/3000
ORBIT Software USA, Inc.	Danville, CA	(800) 89ORBIT	Hour Glass 2000
Redstone Technologies, Inc.	Aurora, CO	(888) 766-7610	Millennium Rx
Robelle Consulting Ltd.	Surrey, BC CAN.	(888) ROBELLE	SmartDate
SolutionSoft Systems, Inc.	Santa Clara, CA	(888) 884-7337	Time Machine for MPE
USIN International, Inc.	San Jose, CA	(408) 441-8800	Star2000

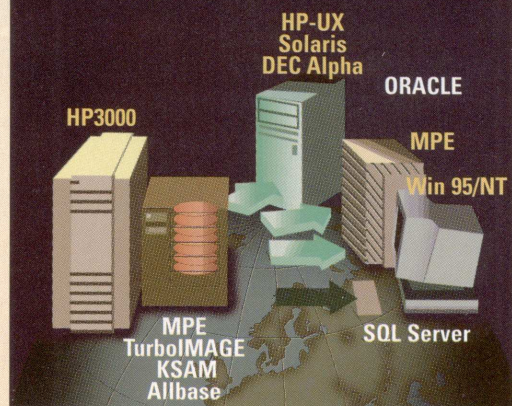


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**FREE One-Day Seminar**  
Chicago Marriott – Downtown  
August 11, 1998

# Moving Your Mainframe to the 21st Century

## *Web-to-Host for Today and Tomorrow*

**We invite you to attend a FREE one-day business-oriented seminar for IT management and professionals.**

How do you make the information on your legacy hosts – the core of your enterprise – available on your intranet without compromising business-critical applications? Many vendors tout web-to-host technology as the answer, but how can you migrate safely from present-day solutions to the web-based solutions of the future?

Invest a day with *Enterprise Systems Journal*, Hummingbird Communications and noted SNA expert Tom Nolle to find out.

Tom will provide clear directions on how to approach intranet design and implementation with both fat and thin clients, starting with the objectives and key issues of enterprise intranets and drilling down to the details of information integration, intranet structure, network planning and support.



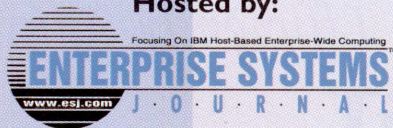
Tom Nolle

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- Learn the key issues and implications for your network and applications when implementing an intranet
- Discover the different options for information integration on client, host and server
- Understand the special issues involved in planning and implementing a thin-client solution

- Learn how to integrate existing fat-client systems with thin-client web-to-host technology that delivers scalability, manageability, ease of migration and real TCO savings

This seminar is a comprehensive business-oriented buyer's guide to building intranets that deliver mainframe access, presented by

a speaker noted for his down-to-earth, practical approach. Join us to find out how you can bring your mainframe into the 21st century using web-to-host technology without abandoning tried and true solutions.

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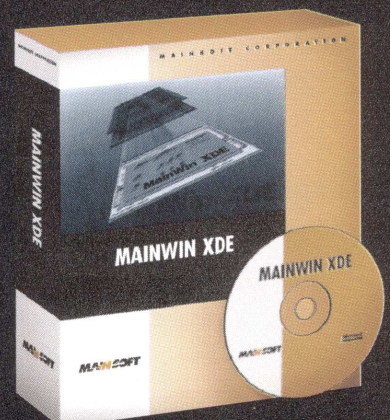
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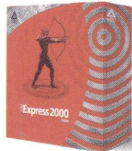


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